Braille Monitor

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BRAILLE: CHANGING ATTITUDES, CHANGING TECHNOLOGY

by *Kenneth Jernigan*

On rare occasions we devote an entire issue of the *Monitor* to a single topic. That is what we are doing in the present instance. The topic is Braille. Braille is so central in the lives of the blind and so much is happening in the way of new attitudes and new technology that an overview is needed—a bringing together of facts, an attempt at perspective.

Before the time of Louis Braille, blind persons had very little opportunity to read at all. Of course, because of the low literacy rate, many of the sighted were in the same boat. Nevertheless, the blind were at a distinct disadvantage. Through the years there had been attempts to develop this or that sort of tactile system, but it was Louis Braille who made the breakthrough in 1825.

However, his invention was only a beginning. Throughout the remainder of the nineteenth century Braille was the center of controversy and opposing views. Different systems and configurations of dots to form the alphabet coexisted side by side, and each had its advocates. The disputes continued into the twentieth century, and, for that matter, are still taking place. Even now, the Braille Authority of North America is debating new rules and contemplating changes.

When I entered the Tennessee School for the Blind as a boy of six in the early 1930's, I was exposed to New York Point, American Braille, Grade One, Grade One and One-Half, Grade Two, Moon Type, and some sort of unfathomable raised print, the name of which I either never heard or soon forgot. I hasten to add that nobody even attempted to teach me all of these various systems. I was merely exposed to them and told of their numerous virtues or shortcomings by whichever advocate happened to be speaking at the moment. In the first grade I was taught (or, at least, an attempt was made in that direction) both to read and write Grade One Braille. The writing was done on a board slate, and I have always been glad that I learned the use of the slate before being introduced to the Brailler (the equivalent of a typewriter). Incidentally, although I can now read Braille with perfect ease at several hundred words a minute and can write it with speed and accuracy on slate or Brailler, I flunked both Braille Reading and Braille Writing in the first grade, necessitating going through the first grade again the following year. Yes, it was a different world.

As I progressed through high school and college, I became acquainted with the British system of writing Braille, which had a number of differences from what I was accustomed to. For instance, the first time I realized that the British used the letters JC for Jesus Christ, I thought it a bit familiar and not at all in keeping with what my history books had taught me about the conservative and stodgy nature of the inhabitants of that part of the world.

Even so, by the early 1940's everybody who could read Braille very well at all could get along with almost anything that was floating around. New York Point was not being produced anymore, and American Braille was about in the same situation. Moon Type (which was a series of curved lines invented by an Englishman named Dr. Moon for the purpose of making it easier for older blind persons to read) was almost non-existent, a few volumes being kept at

most of the residential schools for the blind as conversation pieces and to impress visitors.

In the early 1940's most blind children went to residential schools, and Braille was pretty much the standard medium for teaching. Large print (or Sightsaving material—a term with curious connotations since it does nothing of the sort) was discussed now and again, but mostly it was still waiting in the wings. Students who were blind enough to go to the residential school but who had some remaining eyesight ("partials" they were called—and some of them were quite high "partials") learned to read Braille with their eyes, and they stubbornly and persistently took every opportunity to do it despite the scoldings and objections of their teachers. In fact, there was quite an art to the rapid reading of Braille visually. As I understand it, the dots were not read directly. Instead, the page was so held that the dots cast shadows, and these were read. Be that as it may, a constant state of war always seemed to exist between the teachers and the "partials," doubtless honing wits of both groups and building character into the bargain. The teachers developed a large cloth apron-type affair (known as a "blindfold," which it wasn't) and insisted that the partials wear it while reading or writing Braille. A loop fitted over the neck and the cloth "blindfold" was draped over the Braille material. The student was expected to put his or her hands underneath the cloth and do the reading or writing. The "partials" countered by trying to hold the top of the "blindfold" away from the body and peeking under it. Of course, when the teacher's back was turned, the "blindfold" was pushed aside altogether.

In some of the schools the teachers stepped up the warfare by turning off all of the lights in the night study hall sessions—leaving sighted teachers (most of them were sighted at that time), "partials," and the totally blind all in the dark together. Of course, in such a situation the totally blind were at a considerable advantage, and the sighted teachers (having usually learned very few if any of the techniques of blindness) labored under a severe handicap. The "partials" were somewhere between, depending on how well they had learned to function as blind people.

I was called on to supervise such a night study hall in the late forties and early fifties when I was a teacher of English at the Tennessee School for the Blind, and the maintenance of discipline posed unique problems. It takes a bit of practice and skill to follow the trajectory of a thrown object back to its point of origin, but the science can be mastered—not to mention which the teacher tends to have certain inherent advantages in such warfare. At least, such was the case in the climate of discipline and practice which prevailed at that particular time in our history. Let me simply say that the outcome was not always certain and that the situation was turbulent, but it provided a certain amount of stimulation and was both challenging and doable.

In the meantime another element was beginning to come into play, one that would have a far-reaching impact on the future of Braille. In the 1930's the talking book machine began to be increasingly available and popular. At first its impact on the teaching of Braille (especially, in the residential schools—and that is where most of the teaching was done) was minimal. Because of the politics of the federal legislation authorizing library services for the blind, talking books, which were a principal component of the library services, were not supposed to be available to children. The talking book machines and records were

not used in most of the residential schools until after the mid-forties and even then at a very slowly accelerating pace.

In view of the fact that blind adults (people somewhere in the neighborhood of sixteen or thereabouts) were entitled to borrow from the libraries around the country; in view of the fact that the definition of the word "adult," as well as the way of figuring one's age can be variously interpreted, depending upon the exigencies of the situation; and in view of the further fact that many of the libraries were in states far removed from their borrowers and could do little to test the veracity of the information provided to them by those borrowers, talking book machines and records began to make their appearance in the schools with increasing frequency.

However, they were not generally used in the classrooms or the school study halls but in the bedrooms of the students and in their homes during vacations. The early talking book machines were heavy and cumbersome, and the records would only play about fifteen minutes to the side. *War and Peace,* for instance, came in eight large containers comprising 160 records, and *Gone With The Wind* was on 80 records. Nevertheless, the quality of the reading was excellent, and one could do other things with the hands while listening. Before the advent of the talking book, Braille was the only "game in town." If you were blind and if you wanted to read, you learned Braille, but now there was an alternative.

When the wave of retrolental fibroplasia spread thoughout the population in the forties and fifties, leaving thousands of children blind, the residential schools could not have handled (even if they had wanted to) the massive influx of students. Before retrolental fibroplasia, most state residential schools for the blind had somewhere between one hundred and two hundred students. Now, in the late forties and fifties, the number of blind children needing education was several times that much in many of the states. There were not enough trained teachers to meet the need, and the American Foundation for the Blind got into the act, helping promote teacher training courses in a number of colleges and universities. Many felt that the American Foundation added a negative element to the problem by its constant discussion of which was the better setting for educating the blind child, the residential school or the local public school. Of course, the debate was largely meaningless since the residential schools could not possibly have met all of the need and since many of the local public schools were also unable to do an adequate and meaningful job. Be this as it may, the American Foundation filled a gap which no one else was prepared to fill and, thereby, performed a positive service. The philosophy was usually not the best, and there were often power plays; but the alternative to the American Foundation's stepping into the breach would undoubtedly have been that many blind children who got at least a fair degree of education would likely have had none at all.

In the pre-retrolental fibroplasia days, when the great majority of blind children and most of the newly blind adults who received instruction in Braille got it in the residential schools, classes were relatively small, and a good deal of individual attention could be given. Moreover, most (not all but most) of the Braille teachers were really expert at Braille. They knew Braille, and they could read and write it.

With the new wave of blind children coming into the schools, there were bound to be changes—and not only changes but also a loss of quality in certain areas—the kind of thing which always characterizes "crash programs." Many of the new teach-

ers were not expert in Braille, and they were not as sure of its centrality and necessity as their predecessors had been.

The talking book machines were now lighter and smaller than they had been, and the records were beginning to be lighter and longer playing. As compared with the heavy thirty-three and one-third rpm fifteen minute to the side disc of the 1930's, for instance, today's talking book record is a paper thin, lightweight, floppy disc, which runs at eight and one-third rpm and plays an hour to the side. Other things have also come to compete with Braille. First came the open reel tape, and today it is the cassette. The cassette player and the books recorded on cassette are much more portable and easier to get from place to place than Braille. In the schools today talking books and cassettes are often used early on, and this necessarily means less reliance on Braille.

Then, there is the matter of large print (the "Sightsaving" material of old) and various electronic and manually operated magnification systems for blind children who have some remaining residual vision. This is not merely a matter of new facts and techniques but often of philosophy as well. I have sometimes told the story of going into a classroom and having a teacher say to me in the presence of two young children, one totally blind and one with some remaining vision, "This little girl can read print. This little girl has to read Braille." Of course, the words *can* and *has* were the key to the matter. Undoubtedly without consciously knowing that she was doing it or meaning to do it, the teacher was "putting down" Braille and making it less attractive and pleasant to read. She may have been helping to cause the totally blind child to be a poor Braille reader, or virtually a non-Braille reader. She was teaching both children that it is not respectable to be blind and that, if you are blind, you cannot expect to compete on terms of equality. After all, the girl with some residual vision had only about ten percent of her eyesight, and if you are capable in proportion to your ability to see, ten percent of a person is not much.

This is not to say that some of the magnification devices and other visual aids have not been of help to those with residual vision, for they have. Rather, it is to make the obvious point that such devices have led (at least, to some degree) to a deemphasis of Braille. If visual aids are seen in context and used with reason, they can be positive (whether for children or adults), but if their use is pushed to the extreme (as has been the case in some of the schools and adult training programs), the results can be very nearly disasterous. For example, I know a number of people who wanted to learn Braille when they were children in school and were not permitted to do it, being told that the "normal" thing to do was to read print and use their remaining vision. They were compelled to do this despite the fact that their prognosis was for continuing deterioration of sight and despite the fact that their vision was so poor that they could not read print (even large print) with comfort and fluency. Many of those people are now totally blind, and no small number of them deeply resent the way they were treated. They are either poor Braille readers or have had to expend a great deal of time and effort to learn the skills they could easily have been taught in school.

There are other developments which have impacted upon Braille—the thermoform machine, for instance. When it was announced, the thermoform seemed such a positive thing. It allowed an individual to take a regular sheet of Braille, place it on a platform, and draw a piece of heated, thin

plastic down over it to reproduce the Braille dots. It was a veritable copy machine for the blind. It made it possible to duplicate single copies of individual Braille paper, or for that matter, short-run multiple copies. If it had been used for program agendas, throw away information, or making copies of Braille letters—in other words if it had been used as print copy machines are used, it would have been an unmixed blessing. It would have strengthened the use of Braille.

But such was not to be the case. Over the years a great many books have been hand transcribed by sighted volunteers. More and more, with the advent of the thermoform machine, the original paper Braille copy of the book has been kept on file by the transcribing group or the library as a "master," and thermoform duplicates have been sent out to fill requests. In my opinion (and that opinion is shared by most Braille readers with whom I talk) this has done a great deal to discourage the use of Braille.

For my part I find prolonged reading of thermoform extremely unpleasant. The plastic sheets tend to stick to the hands, and the fingers tend to be irritated after a time. Moreover, I cannot read thermoform nearly as rapidly as I can read Braille produced on paper. Certainly I cannot read it as pleasantly.

I suspect that if print were so produced that it hurt the eyes of sighted people who read it, far less reading would be done by the sighted than is the case today. I further suggest that the alternative to print (television) would—assuming that such is possible—be even more popular than it is today. This is not to blame anyone, nor is it to shrug off the problems (economic and otherwise). It is simply to state facts as I see them and to hope that we can find solutions.

The last few years have brought still other developments in technology. There is the Kurzweil Reading Machine, which scans a print page and translates it into spoken words. This machine has achieved some positive results, but it still has a ways to go to fulfill the initial hopes which people had for it. It is too costly for the individual blind person to afford; it still has certain technical problems; it is not easily portable; and it is not clear whether enough capital will continue to be put into its development to make it an ongoing major factor in the total mix of reading for the blind.

Then, there is the Optacon—a scanning system which translates what the camera sees on the printed page into a pattern of vibrating, closely packed reeds which can be felt with one finger. Again, there have been certain positive results with the Optacon, but there are also severe limitations—and when exaggerated claims are made concerning its usefulness and performance, the minuses quickly outstrip the pluses. By and large, reading with the Optacon is quite slow, and a great deal of training is required for its skillful use. Moreover, expense is again a factor, but not as much as in the case of the Kurzweil machine.

By no means all (but a great deal) of the Braille produced in this country is purchased through the program of the National Library Service for the Blind and Physically Handicapped of the Library of Congress (NLS). The same is true of recorded and other reading material available to the blind. Thus, NLS has a major voice in determining what kind of reading material will be available to the blind, and in what form that reading material will be.

In the early days of the library program the service was limited to the blind, and Braille received a major emphasis (incidentally, the restriction against serving blind

children has, to the satisfaction of everybody, long since been abolished). In the 1960's pressure began to be brought to open up the library service for the blind to other physically handicapped groups. The NLS was not opposed to this because it would broaden its mission and, presumably, strengthen its power base. Further, since the other groups of the handicapped have never been as strongly organized as the blind, it would presumably water down the political impact on policy matters by making us a smaller part of the total constituency. To say that these political considerations undoubtedly figured in the Library's policy decision is not to say that the Library may not also have felt that the other groups needed service and that NLS could fill that need.

When the legislation to add other groups to the library service was introduced, we opposed. We said that we favored providing library service to the other groups but that we felt it should be done through another division of the Library of Congress. We said that since these groups did not use Braille, their inclusion would mean a proportionately smaller amount of resources devoted to the production of Braille. We further expressed concerns that all phases of service to the blind would suffer by adding the larger constituency as opposed to establishing for it a separate program. Nevertheless, when the legislation was introduced into the next session of Congress, we agreed to its passage provided safeguards could be established and assurances could be given that our concerns could be satisfied.

Within recent years there has seemed to come a recognition that Braille must again receive an increased emphasis. Valuable as the other means of communication may be, there are certain areas in which there is simply no substitute for Braille for the blind person. Taking notes and writing can be done more efficiently in Braille than by recording—assuming, of course, that the person using the Braille is skilled. Intensive study is more easily done by Braille than from a recording, and there is no adequate substitute for Braille in delivering a public speech, verbatim or from notes. There is also the pleasure of reading aloud to others or to oneself, but this admittedly gets into the realm of the subjective. However, it is highly doubtful whether the majority of the sighted population would consider for a moment giving up all print in favor of recorded material—or, even for that matter, television.

As we move into this present decade, there are several hopeful signs. In the first place let it be said that the NLS and all other groups involved with the blind would like (if a feasible way can be found to do it) to have plentiful and readily available Braille at low cost for the blind. The question is how to do it. Some of the recent developments in the production of Braille by computer are extremely hopeful and could serve as the subject for an entire article themselves. There is increasing hope that the computer can provide breakthroughs which will make possible a greatly increased quantity of Braille at a much reduced cost.

However, unless those of us in the field recognize the importance of Braille and train people to read it and rely on it, it will become a dying skill regardless of its cheapness or availability. Furthermore, unless we make Braille available in a form and in a texture which allows for rapid and pleasant reading, its use will diminish. Braille is one of the most useful tools which the blind have, and we must extract from it its maximum potential.

This brings me to one of the most revolutionary concepts in the production, cost,

portability, and usability of Braille which has ever been contemplated. I refer to what has been called "cassette" or "paperless" Braille. The idea is that a large quantity of Braille could be stored on a very small cassette and could be displayed through small pins that could be raised to form the Braille dots. There are several such machines in the offing, and the National Library Service is considering purchasing one of them—or a hybrid of the best features of as many of them as it can put together. If the effort is successful, NLS would probably look toward eventually replacing regular Braille volumes in its collection with the cassette Braille machines. I have personally examined two of these machines—an earlier model of the Elinfa and TSI's Versabrailler. I have not examined the Rose Reader, but if it can do what its inventors claim, it may hold the key to the future. Of course, the "if" must be kept in mind. The problem with the Elinfa and the Versabrailler is that they display only one line at the time—and not a very long line at that. I think this would mean that the fast Braille reader would be slowed down, but we will have to see. When I tried the Versabrailler (and I must emphasize that I only used it for a few minutes on one occasion), I could read Braille on it very nearly as fast as I could talk. However, I can read ordinary Braille on a regular paper page much more rapidly than that. Of course, I do not know what I could do if I spent time training on the Versabrailler, but since I use both hands and read on two lines at once in reading ordinary Braille, common sense tells me that if I have access to only one short line at the time I will necessarily be slowed down.

When I tried the Elinfa, I thought it was totally worthless. However, I cannot emphasize too strongly that I saw it only once, that it was an early model, and that it probably still had bugs to be worked out of it. Since it displays only a single short line at the time, some of my comments about the Versabrailler would also be applicable.

As I have said, I have not examined the Rose Reader, but its inventor claims that it will display an entire Braille page at once. I should think that this would be a tremendous advantage.

The National Library Service has recently been making tests involving cassette Braille. It has also found itself in a controversy with some of the manufacturers of the machines—particularly with Mr. Leonard Rose, one of the inventors of the Rose Reader. Much of the remainder of this issue of the *Monitor* will be taken up with correspondence and publications concerning the development of cassette Braille. NLS has published five bulletins called *Facts* dealing with cassette Braille. There has also been lengthy and rather heated correspondence between Mr. Rose and officials at the National Library Service. In fact, I assume that this correspondence is not at an end. In this issue of the *Monitor* we are printing the five *Facts* bulletins issued by NLS, along with attachments to *Facts* Five, a letter from Dr. James Bliss of Telesensory Systems, Inc., and a letter from Mr. Guy P. Carbonneau of Triformation Systems, Inc. In addition, we are printing the Leonard Rose-NLS correspondence. Also, we are rounding out the picture by reprinting two former *Monitor* articles concerning Braille: 1) "Braille: A Birthday Look At Its Past, Present, and Future" by Jim Burns (*Braille Monitor,* March, 1975); and 2) "Braille: A Comedy or a Tragedy" by Ramona Walhof (*Braille Monitor,* April, 1980).

Even to those blind people who do not read or write Braille, this entire topic should be of vital interest. What happens

to Braille will have a major impact upon the future of blind people, and we should thoroughly inform ourselves and then take a hand in helping decide what will be done.

FACTS

Cassette-Braille Technology

January 1980

Network librarians, Braille readers, and other interested persons have inquired about the purpose and progress of cassette-Braille evaluation at NLS. Some reports on this project have appeared in *Projects and Experiments,* an insert in *News,* but increasing interest has suggested the use of a periodic fact sheet.

Purpose of the Evaluation

Several cassette-Braille devices have been developed in the past three years. The state of technology is apparently right; the interest by developers and manufacturers is high; the advantages for Braille production, distribution, and use are very promising.

A cassette-Braille device (also referred to as paperless Braille or electronic Braille) is similar to an audio-cassette device in its use of a cassette and cassette deck. It usually offers audio input and output. The distinctions are:

(1) Braille input is accomplished by using Braille writer keys.
(2) electronic signals on the cassette tape represent Braille characters instead of voice or music.
(3) the output is in Braille.

Braille output is achieved by displays of pins, usually on a twenty- or thirty-two-character line. The display area is on the top surface. The pins are activated by solenoids or piezoelectric mechanisms. There are several such devices. These three are now or soon will be in production and have been examined closely: the Digicassette by Elinfa in France, the Braillocord by AID Electronic in Germany, and the VersaBraille by Telesensory Systems in Palo Alto, California.

Evaluation objectives are:

1. Determine the extent of acceptance by Braille readers of the cassette-Braille method of reading.
2. If the method is largely acceptable to Braille readers, identify the preferred features and system-design improvements needed.
3. Explore the feasibility of providing a lost-cost device meeting reader requirements and NLS design and performance specifications.

Planning

Richard Evensen, Program Analyst, is the project leader. He has had close cooperation in technical advice from Henry Paris, Assistant Chief for Materials Development, and Lloyd Rasmussen, Electronic Technician.

The following planning elements have

been determined:

1. Only production models, not prototypes, will be studied.
2. No more than 100 machines will be included. The cost for each is about $4,000.
3. Machines will be deployed in four metropolitan areas for ease of field management.
4. Choice of cities will depend on several factors, chiefly that they have a Braille-lending library and represent the four regional conferences.
5. Readers will be selected to represent as much as possible a cross section of the national Braille-reading population.
6. Magazines will be the vehicle for evaluation. Their periodic issuance increases the possibility of continued use of cassette-Braille devices by reader-participants.
7. Cooperation of at least one Braille producer will be essential.
8. An outside firm under contract to NLS will conduct the day-to-day aspects of the evaluation, with NLS providing close coordination.
9. The cassette-Braille machine manufacturer(s) will provide compatible interface with the Braille producer's computer, duplication of master cassettes, and prompt field service of equipment.

Action Steps

1. Following appropriate government bidding procedures, VSE Corporation, of Alexandria, Virginia, was selected as field manager for the year-long evaluation of reader acceptance of the cassette-Braille concept. The contract began in September 1979. VSE's job is essentially coordinating the project and managing day-to-day details. The key personnel are Jim Ward, who has had several years' experience in engineering design and analysis, and Randy Knapp, acting as Braille consultant. Others will participate in later phases. VSE has already begun on the project, identifying the many elements related to dealing with machine manufacturers, the Braille producer, regional libraries, cassette suppliers, and NLS.
2. Clovernook Home and School for the Blind has been selected as the Braille producer.
3. Libraries in Baltimore, Maryland; Little Rock, Arkansas; Oklahoma City, Oklahoma; and Los Angeles, California, have been chosen to help select reader-participants. Al Miller of the Maryland Regional Library and Cleotta Mullen of the Arkansas Regional Library have already submitted names and available personal data. Participants will represent a spread of age, employment, and/or student background, with about twenty participants from each library service area. In early December letters in Braille and print were sent by VSE to readers in the metropolitan Baltimore area; response has been good.
4. Fifty-five Elinfa Digicassette machines were received last spring, carefully tested in the NLS laboratory, modified according to NLS requirements in the Elinfa Washington Office, and tested by Braille readers on the NLS staff. The June issue of *Horizon* was the first test piece. Elinfa inventors Oleg and

Andree Tretiakoff and their staff engineer, Steve Smith, have performed many technical checks and modifications, and have worked with Martin Droege of Clovernook and Joe Sullivan of Duxbury Systems (a software consultant) to set up the interface between the Elinfa System and Clovernook's PDP-11 Computer System. There have been problems, but cooperation has been good. A master-cassette copy of the December *Better Homes and Gardens* was delivered on December 18 to Elinfa in Washington for the second test, and copies were made immediately for checking by VSE and NLS.

The Elinfa machine has a 20-character display. It is a read-only model (no Braille input is possible). Through a programming routine developed by Duxbury Systems, no word is broken arbitrarily at the end of the display line as occurs on a read-write Elinfa with manual input.

5. Two VersaBraille machines were ordered from Telesensory Systems Inc. (TSI) for testing in the NLS laboratory and by NLS staff Braille readers. The two machines from the first production run were delivered and thoroughly demonstrated on December 19. More details on this machine will appear in the next fact sheet.
6. Two machines were purchased from the German manufacturer of Braillocord. In the spring a U.S. manufacturer's representative was identified and planning was begun for an interface for the Clovernook computer, and timely delivery of production machines.

Many readers have volunteered for this study. Unless they are in one of the four metropolitan areas mentioned, we decline their kind offers with a personal response. If a reader asks to participate, please explain the geographic restrictions to achieve representativeness.

For further information contact: Richard H. Evensen, Program Analyst, NLS/BPH

FACTS

Cassette-Braille Technology

May 1980

Field Evaluation Start-Up

The cassette-Braille evaluation discussed in the January 1980 *Facts* is under way. Twenty participants in the Baltimore area have been identified and contacted by VSE Corporation, the contractor managing the field evaluation. Participants chose from the magazines offered: *Better Homes and Gardens, Braille Variety News, Family Health, Playboy, Popular Mechanics,* and *Psychology Today.* By mid-April, one or two issues of all six magazines had been produced and duplicated.

The Elinfa Digicassette reading machines were checked by VSE. Distribution of

machines and materials was held up unexpectedly because appropriate-grade blank cassettes had to be back-ordered by the local supplier. Participants in Baltimore were visited personally by VSE in the second half of February and early March, and were instructed in use of the equipment.

Braille readers' reading speed and comprehension were obtained by having each participant read ten Braille pages of the book, *Earthquakes* by D.S. Halacy, Jr.

VSE prepares Braille labels for each cassette, as well as mailing labels, but stuffing and mailing are done in the Project Coordination Office at NLS. A return label is included, and participants are asked to return cassettes to NLS when they have finished reading the issue.

The Elinfa machine permits searching for an article by use of the tape-counter. Each revolution is displayed as a three-digit number. Elinfa and Clovernook devised the indexing scheme. Clovernook devised the contents-page format whereby a counter number rather than a page number is given as the starting-point for each article. Participants have found the system useful.

Participants are instructed to keep logs of use, reaction, problems and comments, and to call VSE collect when problems occur. Action is prompt—replacement of a machine or cassette, or help with operation or identifying a problem.

With the Baltimore experience behind them VSE staff found that placing machines and materials with Little Rock participants ran much more smoothly. Deliveries begun in the middle of March were completed by the end of March.

Names of Braille readers were obtained from the regional library in Oklahoma City in April and a few responses have already been received. The list of Los Angeles participants was firm by the end of April.

VersaBraille

Fifty VersaBraille machines were ordered in January. Twenty-five will be allocated to the Los Angeles area and twenty-five to the Oklahoma City area. They will be delivered in May and June. Henry Paris of NLS visited Telesensory Systems, Inc. (TSI) in mid-March, examined the production process and quality assurance procedures carefully, was greatly satisfied, and recommended sending machines directly to the sites in order to expedite delivery.

Like the Elinfa, the VersaBraille has a twenty-character display line and presents only whole words. It has many more controls, and its indexing and search system is quite different.

One indexes by using word or words occupying up to ten Braille cells. Fifty search points are possible on one side of a cassette. The first display one obtains is the index. One reads through the index until the desired keyword(s) is found, Brailles the keyword exactly as displayed, then presses the advance bar and waits for the requested section to be displayed. One then reads the section, bringing up a new line by pressing the advance bar—a long bar like a typewriter space bar—just above the Braille display.

The model purchased has writing as well as reading functions, but only controls for the latter are described here. In addition to the advance bar, there is a back-spacer for bringing up previous lines, and buttons for calling up a chapter (search point), page, paragraph or word, and for selecting the Braille or audio mode.

Whereas the Elinfa has a one hundred twenty-cell block in the buffer, VersaBraille has a one thousand-cell block—which the manufacturer calls a page.

In January and February, TSI engineers installed the software system at Clovernook for interface with its PDP-11/34 computer

system. Two test cassettes were produced by Clovernook, and the second one was approved after minor modifications by TSI. The first masters of magazines for Los Angeles participants were produced in late April. TSI will duplicate the masters.

Braillocord

The German engineer from AID Electronic, the manufacturer of Braillocord, brought the specially designed interface equipment to Clovernook in March, and the test cassette to NLS. Several technical problems were noted, and the engineer returned to Germany to make the changes. A second attempt was made at Clovernook by AID's U.S. Representative; a second test cassette was produced, which was also unsatisfactory. Some software changes are needed, and it is expected that the next attempt will be successful. The Braillocord System will be described in the next fact sheet.

Progress

By way of summary:

1. Elinfa reading machines have been delivered to twenty Braille readers in Baltimore, twenty in Little Rock.
2. Cassette-Braille copies of six NLS-produced magazines are being sent on a regular basis to these Braille readers according to their requests.
3. Fifty VersaBraille read-write machines have been ordered, with delivery to begin in May.
4. TSI has mounted the software at Clovernook to permit production of cassette-Braille masters compatible with the VersaBraille System.
5. The Braillocord interface equipment was introduced at Clovernook, and testing is under way.

Several people have asked about reader reactions, but we have not formally asked as we feel it is too soon to begin collecting accurate data.

For further information contact: Richard H. Evensen, Program Analyst, NLS/BPH

FACTS

Cassette-Braille Technology—3

November 1980

1. The cassette-Braille evaluation described in two previous issues of *Facts* dated January and May 1980 has been extended six months. This is due to Braille display problems experienced with the VersaBraille machines. TSI, the manufacturer, has identified and corrected the problem.
2. VersaBraille machines and accompanying magazines edited by TSI were delivered to Los Angeles participants in late October and early November by the representative from VSE Corporation, the contractor managing the evaluation in the field.
3. Because of the time constraints on this evaluation, Elinfa machines rather than VersaBraille machines were placed with sixteen participants in Oklahoma City.
4. The first group of participants from

Baltimore has completed its evaluation. The post-test for speed and comprehension was the second chapter from the book *Earthquakes.* A difference from the pretest is that participants read one-half of the chapter on cassette, one-half from the original book.

A questionnaire was administered in person to each participant by the VSE representative. Each participant gave information about use of the equipment and cassettes, the presence or absence of particular problems, and qualitative comparisons of cassette with paper Braille. Several gave positive reactions to the cassette-Braille concept.

5. The Braillocord interface at Clovernook is functioning satisfactorily. Further work by the developers from AID Electronics in Germany and by the software specialist in this country was successful by late summer. Twelve Braillocords have been ordered from Germany.

   Searching on the Braillocord is different from those of Elinfa and VersaBraille. A combination of buttons above the display line must be pressed in conjunction with various controls on the cassette recorder-player to find the desired page. One may skip around on a page (32 lines of 32 characters) by pressing one or more buttons located to the left of the display line.

6. A. The Braille magazine *Popular Mechanics* has been dropped from the project because of production problems.
   B. NLS staff has examined the Rose Reader Prototype that provides a full-page display, and the Braillex, an information retrieval device. Both machines store Braille electronically on cassettes.
   C. NLS has reviewed a study by S. Ashcroft of Vanderbilt-Peabody University on cassette-Braille in an educational setting.

For further information contact: Richard H. Evensen, Project Coordinator

FACTS

Cassette-Braille Technology—4

June 1981

1. The cassette-Braille evaluation project has been extended another nine months, to December 31, 1981 to acquire sufficient data. Repeated interruptions in the availability of machines and in the regular flow of magazine materials, and irregular use of equipment and materials by several volunteer participants contributed to inadequate feedback.

   About seventy volunteers from the metropolitan Washington, D.C., area have agreed to assist in a new phase of the evaluation. Like previous participants, all receive magazines produced by Clovernook. The regional libraries in Baltimore, Washington, and Richmond cooperated in the selection of these participants. Some readers will receive VersaBraille machines, some Digicassette machines. All will receive one or more of the five magazines offered; some may also receive books

prepared in this format. Since VSE Corporation, the contractor managing the field-test, is based locally, it will be easier to assist participants and to encourage regular activity in the project.

2. Digicassette machines were retrieved from Little Rock participants in December 1980 and from Oklahoma City participants in February 1981. The same speed test and questionnaire were administered as with Baltimore participants and with strikingly similar results. Early indications are that faster readers of paper Braille read about half as fast in cassette-Braille; those in the slower reading group have a lesser drop in reading speed; and a few were equal in both media. Secondly, comprehension (actually, simple recall) showed no clear pattern. Finally, comments about cassette-Braille as a concept were quite positive, although participants were quick to state specific dissatisfactions with a machine and to suggest specific improvements. Further analysis is necessary and will be included in the contractor's final report to NLS.
3. Equipment and materials were picked up in April from Los Angeles participants. This is the first group that worked with the VersaBraille machine and materials. Despite some difficulties in keeping up a regular flow of magazines (see item 6), most users stayed with the project, and the contractor reports great enthusiasm. Unlike the Digicassette, however, the VersaBraille allowed Braille input as well as reading. This capability must be factored into assessing user reactions.
4. Twelve Braillocord machines were received in December. The U.S. Representative visited NLS in January to substitute plugs with the usual flat prongs for the plugs with round prongs used in Germany. Some displays were not functioning properly and must be replaced.
5. Engineers at Triformation Systems (the U.S. manufacturer-distributor of the Digicassette) have modified twenty-five NLS machines with a new line-change switch, that requires positive action rather than the finger touch of earlier models. A newer model of the total system has word indexing and search capabilities, a large buffer, and other features. Braille readers on the NLS staff will experiment with this new system to determine whether speed of reading is more like that with paper Braille because there is continuous feeding of Braille lines, even between buffers, rather than the present 2.4-second delay.

   Triformation has devised a system, as did Clovernook earlier, to produce cassette-Braille materials. The difference is that Triformation can produce cassette-Braille books which may be included in the evaluation.
6. Clovernook experienced difficulties in preparing master cassettes on the VersaBraille system. Consultation (usually by telephone) by NLS, VSE, the software consultant, Clovernook, and TSI resulted in a software change in the Clovernook system. The TSI longer-term solution was to replace the VersaBraille interface at Clovernook with a newer interface (P2) with updated hardware and software. One of these interfaces was checked by the software consultant at Duxbury Systems and installed at Clovernook. Further work is necessary to determine the cause of the VersaBraille interface's rejecting data transmitted by the Clovernook computer.

7. Individuals interested in the cassette-Braille project may contact NLS to be put on the mailing list for these reports.

For further information contact: Richard H. Evensen, Project Coordinator

FACTS

Cassette-Braille Technology—5

September 1981

At the request of James C. Bliss, President of Telesensory Systems, Inc. we are reproducing as Attachment 1 Dr. Bliss' commentary on certain data appearing in *Facts 4* June 1981. Attachment 2 is Dr. Bliss' cover letter.

We also offered an opportunity for comment to Guy P. Carbonneau, President of Triformation Systems, Inc. Mr. Carbonneau's commentary is reproduced as Attachment 3.

Reader reactions and comments should be made as appropriate to:

Dr. James C. Bliss, President
Telesensory Systems, Inc.
3408 Hillview Avenue
Palo Alto, California 94304

(or)

Mr. Guy Carbonneau, President
Triformation Systems, Inc.
3132 S.E. Jay Street
Stuart, Florida 33494

Attachments

For further information contact: Richard H. Evensen, Project Coordinator, NLS/BPH

August 19, 1981

Commentary on the NLS Cassette Braille Evaluation Project

by *James C. Bliss*

The purpose of this note is to comment on the National Library Service cassette Braille evaluation project and, in particular, to elaborate on some of the statements made in *Facts*, Cassette-Braille Technology, *Fact 4*, June 1981.

1. It is important to keep in mind that the purpose of the NLS cassette-Braille evaluation project is not to choose which of the existing cassette Braille machines is best, but rather to determine the set of specifications and features that would be most appropriate for the NLS mission and readership. This mission is to provide recreational reading materials and does not involve writing, etching, or interfacing to other equipment, all of which are important features incorporated into some of the currently available cassette Braille systems.

   If cassette Braille proves to be both

an acceptable media to the NLS readers and economically attractive to NLS, then presumably a special cassette Braille machine incorporating those features and specifications appropriate to the NLS mission would be specially built for NLS. Existing cassette Braille machines are being used in the NLS evaluation as vehicles to determine which features and specifications are most appropriate for the NLS application.

2. The cassette Braille machines being used in the NLS evaluation represent different stages of development. Moreover, the conditions under which machines from different manufacturers are being evaluated are different. For example:
   - Different groups of participants are using the different machines; i.e., Digicassettes have been evaluated in Baltimore, Little Rock, and Oklahoma City. VersaBraille™ Systems were evaluated in Los Angeles. (Some selected Baltimore users will get exposure to both machines).
   - *Facts 4* implies different reading materials may be offered by NLS in the evaluation of the different machines; e.g., books may be offered on Digicassettes but only magazines are being offered on VersaBraille units.
   - Different stages of development are represented by the cassette Braille machines being used in the NLS evaluation:
     i) An early production model of the VersaBraille system (PIA) which is no longer in production. The current production model (PIB) differs in several significant ways.
     ii) A special "read-only" model of Digicassette built only for NLS and not commercially available.
   - Special modifications to the Digicassette machines in the evaluation have been contracted for by NLS. No modifications to the VersaBraille machines have been made.

   In light of the purpose of the NLS evaluation, these differences in treatment of the cassette Braille machines from the different manufacturers may be justifiable. However, these treatment differences certainly invalidate the NLS evaluation for comparison of available production model equipment.
3. *Facts 4* makes the comment that "Early indications are that faster readers of paper Braille read about half as fast in cassette Braille; those in the slower reading group have a lesser drop in reading speed, and a few were equal in both media." While this statement may be valid for Digicassette participants, it does not appear to hold for VersaBraille participants. For example, the 19 Los Angeles participants averaged 104.04 words per minute (wpm) with the VersaBraille and 115.50 wpm with paper Braille. This difference is not statistically significant. The six fastest paper Braille readers in this group averaged 175 wpm in paper Braille and 123 wpm on the VersaBraille. However, the six fastest VersaBraille readers (which includes some different people than the six fastest paper Braille readers) in this group averaged 170 wpm with the VersaBraille and 154 wpm with paper Braille. Again, this difference is not statistically significant. Thus this data does not appear to justify an indication "that faster readers of paper Braille read only half as fast in cassette Braille." An alternate interpretation of the data is that some readers (but not

all) were able to discover, in their relatively short exposure to the machine, techniques for reading with the VersaBraille system which permitted them to read at rates comparable to their paper Braille reading rates.

4. *Facts 4* seems to attribute the great enthusiasm toward the VersaBraille system by participants to the fact that the VersaBraille system allows Braille input as well as reading. We believe that a number of other features of the VersaBraille unit, not related to the writing features, may account for this enthusiasm as well. For example, the VersaBraille unit has automatic chapter, page, paragraph, and word searching capabilities, important features for magazine and book readers who wish to go quickly from the Table of Contents to a particular chapter or selection.
5. *Facts 4* also comments on difficulties experienced in preparing master cassettes on the VersaBraille system. In any pioneering effort some startup difficulties are to be expected, especially if the system depends on communication between two computer systems, each incorporating software written by different programmers. Several small, but frustrating problems were encountered in the process of interfacing the Clovernook and VersaBraille systems. I am happy to report that these problems were solved and that Clovernook is successfully producing master cassettes of magazines on the VersaBraille system.

Palo Alto, California
August 19, 1981

Dear Dick:

Enclosed is a revised version of my commentary on the NLS Cassette Braille Evaluation Project.

Thank you for your response to the original version. I appreciate your suggestions and I have made modifications which I believe take care of all of your objections.

I hope this revised version will now be acceptable and that NLS can promptly disseminate it to the readership of *Facts*.

Sincerely,
James C. Bliss, Ph.D.
President
Telesensory Systems, Inc.

Stuart, Florida
September 4, 1981

Re: *Facts 4*, June 1981

Dear Dick:

Thank you for your letter of August 10, 1981. We appreciated the opportunity to comment on the "softbraille" evaluation project.

It has always been our understanding that the National Library Service undertook the evaluation project to determine the feasibility of a hard tactile readout vs. conventional paper Braille. In this light, the original specifications which were provided to Elinfa, S. A./Inc., were to produce a paperless Braille reading machine with a tactile display and not for a paperless Braille word processing device.

After many units were shipped, and during the time of the evaluation, many new and drastically different units were introduced into the market place. Yet, the basic intent of the evaluation program was to ascertain the feasibility of whether or not the blind and visually impaired Braille

readers would welcome a change to "soft-braille" and could adapt to the paperless Braille concept with its hard tactile display.

The new machines have many functions that are user oriented and with the advent of the microprocessor versions, have provided the first paperless Braille word processing units to the blind community. These enhancements allow the visually impaired student, computer programmer, and many others to reach a level of flexibility—never achieved before.

It was not the intentions of National Library Service to evaluate the new enhancements to the equipment, but the concept referenced above. It is also our understanding that it is not the intentions of the National Library Service to compare the VersaBraille with the old version of the Elinfa Digicassette Reading Machine; since these two units are not comparable. However, Telesensory Systems' VersaBraille Model P1 does compete with the Triformation Systems' Model DC20M, Digicassette.

We applaud the National Library Service for undertaking this project and would hope that they disseminate a critique of the goals of the project and the NLS's desire to obtain a modestly priced "paperless Braille reading machine" for the reading of Braille books from cassettes, in the same manner as the NLS has conducted the talking book program.

We, at Triformation Systems, Inc., feel that a modestly priced reading machine *can* be produced in quantities, if the National Library Services were to advertise for competitive bids, through normal channels. This would allow, we feel, the total elimination of any comparisons between any of the paperless Brailling devices presently being marketed here in the United States and the World. Too often, our discussions revolve around whether or not our machine is better than VersaBraille, or better than the Braillink, or Braillocord. This would also set the specifications for what type of machine the NLS desires, what functions are requested, and such similar details. Any unit submitted, not in accordance with the specifications could be eliminated from the bidding procedures.

Once again, we acknowledge the efforts of the National Library Service and its undertaking this evaluation program. However, we feel, that before a modestly priced paperless Braille reading machine can be produced on the open market, an organization, like NLS, must establish the specifications for the device. Anyone desiring an upgraded device, i.e., compatible as a computer terminal—the DC20M or P2 VersaBraille, could take the procurement initiative individually.

We look forward to receiving the parameters of the evaluation program, and within the next few months, hopefully the results of your efforts.

Very truly yours,
Guy P. Carbonneau
President
Triformation Systems, Inc.

A REPLACEMENT FOR PAPER BRAILLE BOOKS . . .

THE ROSE BRAILLE DISPLAY READER

The Rose Braille Display Reader offers full-page Braille display in a compact desk-top unit from information stored on standard magnetic tape cassettes.

The written word. The fundamentals of spelling. The rules of grammar. The discipline of reading. The skills of writing. All are essential to economic survival and personal success in an increasingly industrial world. All are tools we use in the learning process. Reading is reading, whether we read with our eyes or with our sense of touch.

If students could learn better from oral presentations exclusively, schools would dispense with the use of textbooks. But oral presentations cannot effectively teach spelling, punctuation, grammar, or writing to the sighted. They are no more effective for the blind. Until now, the blind have had to depend heavily upon oral sources in their learning process, such as readers, tapes, and discs, because Braille books have been difficult and costly to produce, expensive and massive to store.

The solution is at hand. Using the Rose Reader, the blind can have virtually unlimited access to all literary, mathematical and musical materials in paperless Braille form. The Braille is stored on tape cassettes, which are more convenient to handle, carry and store than inkprint books. Vocational opportunities never before available to the blind and which were beyond their reasonable hopes and expectations will soon be commonplace.

The Rose Reader is as revolutionary as the development of the Braille system by Louis Braille more than a century and a half ago.

User Controls

1. Cassette Tape fits into slot.
2. On/Off Button
3. Page Turner advances the book to the next Braille page.
4. "Touch-Tone" Keyboard is used to move the tape forward or backward quickly to any selected inkprint or Braille page.
   - A Inkprint Page Code Button
   - B Braille Page Code Button
   - C Cancel Command. If the unit is given a command it cannot carry out–such as to rewind a tape that has already been rewound–a "beep" sounds to alert the user.
   - D Rewind Button
   - E Back-up Button
5. Carrying Handle

It takes no more than five minutes for the average person, blind or sighted, to learn to use the Rose Reader.

The Rose Reader requires no new reading skills. The display surface, size and layout of the Braille cells, and size of individual dots are exactly the same as those found on the conventional Braille book page.

Books on Tape Cassettes

Braille Inc., a sister company of Rose Associates, Inc. which developed the Rose Reader, has been a publisher of reading materials for the blind since 1972. Braille Inc. continues in this role by providing books on tape cassettes for the Rose Reader. A full list of current titles is avail-

able upon request.

A large variety of books will soon be available on tape from Braille Inc. Rose Associates, Inc. has developed a device which scans hard copy Braille and transfers it to tape cassettes. The invaluable work done by volunteers and organizations all over the world, transcribing inkprint materials into Braille, will now be able to serve more and more blind people, simply by having Braille Inc. scan and convert hard copy to tapes.

Future Options

Rose Associates, Inc. is in the process of developing the following optional components that will plug into the Rose Reader:

* Braille Keyboard for Note-taking and Writing
* Computer Interface
* Telephone Terminal
* Battery Pack Power Source
* Graphic Display Board
* Calculator Capability
* Pocket-size, Recording Note-writer

The Rose Braille Display Reader (Rose Reader) is the subject of U.S. Patent #4,266,936 issued on May 12, 1981, and is owned by Leonard Rose and Joan B. Rose of Falmouth, Massachusetts. The Rose Reader was developed by Rose Associates, Inc. under an assistance contract from the U.S. Office of Education, Bureau of Education for the Handicapped.

Rose Associates, Inc., 44 Scranton Avenue, Falmouth, Massachusetts 02540 U.S.A. Telephone (617) 548-6116

CORRESPONDENCE BETWEEN LEONARD ROSE AND THE NATIONAL LIBRARY SERVICE FOR THE BLIND AND PHYSICALLY HANDICAPPED

Falmouth, Massachusetts
November 9, 1981

Dear Mr. Evensen:

I am responding to the invitation in NLS *Facts 5* (September 1981) to react and comment about the letters from Dr. Bliss and Mr. Carbonneau concerning data which appeared in NLS *Facts 4* (June 1981). I trust that the NLS will give this letter the benefit of equal time and opportunity to be heard, in the form of an attachment to the next issue of NLS *Facts* when it is sent to its usual list of recipients.

As far as the ongoing testing of "cassette Braille" is concerned, it should be remembered that Braille readers are accustomed to reading paper Braille books and materials in a 40- to 42-cell line, 25-line page format. This compares reasonably well to the inkprint format used by the sighted. A comparison between the utility of paper Braille materials and inkprint materials of the same literary content should be tested only by taking persons of similar intelligence, education and cultural background and presenting them with the same reading materials to be read under similar conditions within a finite measured time period. At the end of the period, the readers can be tested for reading comprehension by a series of questions designed to elicit information about the extent of each reader's

understanding of what was read. Any comparison of reading that does not use understanding as the standard of measurement of the comparison is senseless. The ability to read 3,000 words per minute without understanding may be useful in a computer, but is meaningless for human beings. The information in Mr. Bliss's letter in regard to the number of words per minute on the VersaBraille or on the Digicassette in comparison to paper Braille are empty figures since there apparently was no testing for comprehension by the users.

If the NLS truly had intended to develop a meaningful test for the single-line paperless Braille display devices, it should have developed a test which required sighted persons of the same intellectual, educational, economic and cultural backgrounds as those of the blind test subjects to read inkprint materials of the same format as is used for the Digicassette, VersaBraille and other units. The sighted subjects should have been required to read no more than 20 inkprint characters at a time, through a "window" in which the characters were presented in segments. The inkprint materials should have been the same type of materials that were presented on the Digicassette and VersaBraille units. At the end of the test, both the sighted and the blind test subjects should have been polled for their satisfaction with the single-line display as compared to a full page display. In my opinion, such a test would have resulted in findings that all of the persons tested preferred the full-page format to the single-line display. Common sense indicates that no other test results could possibly be expected.

My immediate and strongest reaction to NLS *Facts 5* is that the title "Cassette-Braille Technology," as that term has been and is being used by NLS, is both a misnomer as well as a misrepresentation about the present state of the art. So-called "Cassette-Braille" is intended as a new alternative to conventional paper Braille materials, but there appears to be a blind tendency to equate "paperless" or "cassette Braille" only with "one-line" type display devices that totally ignores the fact that a full-page "cassette-Braille" unit has been developed, built, and patented. To properly judge "cassette-Braille," it should be compared only in relation to the full page standard format that is used for conventional paper Braille materials. There is no way that reading a few characters at a time, whether it be in print or in Braille, can ever be truly comparable to reading the full-page format of standard inkprint books or standard Braille books.

My second reaction and comment is that the ongoing NLS program and plan to develop a set of specifications for a kind of "cassette-Braille Volkswagen" which the NLS will endorse and, hopefully, supply to all blind persons in the United States is technically, economically, and legally a potential disaster for everyone who may have an interest in the subject of "cassette-Braille technology."

Technically speaking, the NLS methodology is based on a five-year timing cycle, from the point when the current testing program was developed to the point when funding may be forthcoming through Congressional action. This will result in the funding of technology that is necessarily five years old at the time that it is first funded and the money is applied. At best, if Congress provides the funding at the end of the five-year cycle, the blind will have supplied for them an already outmoded and obsolete item. At worst, because of the apparent imminent availability of "cassette-Braille display," the efforts of many currently active volunteer transcribers of conventional paper Braille materials will

diminish to the point that they will no longer be active, their Braille work product will be lost, and the blind will have to rely completely on the limited-cell single-line "cassette-Braille" device of the NLS, which will not be able to display charts, multi-line music, mathematical formats, poetic formats, graphics and many other Braille materials that are essential to educational, vocational, and recreational reading. Compounding the problem of the presently conceived NLS approach is the fact that NLS funding in this area will necessarily focus on its own specifications, and the imprimatur of the NLS on its own device will tend to convince the public and private scientists that no further technological efforts in the field are needed. Public and private institutional funding for development of more advanced technology will tend to diminish and disappear. If Congress fails in the end to fund the NLS "cassette-Braille Volkswagen," the blind will then have no "cassette-Braille" technology at all available to them and they will have to face the frustration that all other sources of technology that might have produced paperless Braille are no longer in operation. At that point the blind will have less Braille than ever, exactly opposite to the effect that is supposedly intended.

Economically speaking, the NLS "cassette-Braille technology" program is actually designed so that the least gain in value and the greatest loss of technological resources in the field of paperless Braille will result from the expenditure of time and money by NLS. When NLS announced that it would purchase none of the existing paperless Braille display devices and would instead test and make its own specifications for such a device, NLS effectively served notice on the manufacturers of all existing paperless display devices (whether in production model or in prototype form) that the capital that they have invested in their current designs, tooling and inventory may have been wasted to a considerable extent, and will be totally wasted if they are not selected to produce the one "cassette-Braille" device chosen by NLS to be the national standard. Business wisdom dictates that manufacturers of existing paperless Braille devices should do little to make radical improvements to their devices, since those improvements will not be specified by NLS in the absence of testing over a period of a few years. The more that improvements are offered to NLS, the longer it will take for NLS to reach a final set of specifications, and the date bidding starts and the time that sales are possible will be delayed even more. There has got to be a limit to the length of time that any manufacturer of an existing paperless Braille display device can continue to support its investment in the device without a significant return on its investment. No manufacturer will tend to keep offering improvements that will inevitably postpone the possibility that its product can be sold in the first place. So, the NLS testing program itself must necessarily stifle serious additional technological developments in the field of paperless Braille.

Furthermore, even if and when NLS does develop its own specifications for a "cassette-Braille" display device, there is no certainty that NLS will come up with a device that can be built for the price NLS feels is appropriate to pay. If some company finds it possible to bid on the device, there is no assurance that the company will be able to hold to its price for the period of time that it would take NLS to obtain funding from Congress. If a company could bid and hold to its price, such a company would have to have a way of supplying the immense capital needed in advance to get into production with an

adequate supply of raw materials and components on hand if Congress and NLS were unwilling to provide progress payments before delivery. Moreover, each potential bidder on such a contract will have to measure its ability to design, tool up and build the NLS device without infringing patents and trade secrets of any other company. Each potential bidder will have to consider whether the risk of being unsuccessful in the bidding process will result in total loss of its investment in its own device because of the incompatibility of its own design and software with that of the NLS device. Each potential bidder will also have to consider the risk of Congressional refusal to provide funding for the NLS device because independent private inventiveness has resulted in the development of a paperless Braille display device that makes the NLS device obsolete at the time that funding is sought for it. The negative factors are many and are quite compelling.

Legally speaking, the entire NLS "cassette-Braille technology" program seems to be on shaky ground. The NLS is testing various proprietary devices with the announced intention to buy none of them but instead to determine what are the best features of each and to develop a set of specifications for an NLS-sponsored device that will incorporate the best features of the units tested. NLS does not seem to have taken into account the fact that the best features of the devices being tested may well be protected by patents or by trade secrets and manufacturing know-how which prevent the other companies from copying or using them freely. An NLS specification that adopts a patented feature can only be produced by the patent owner or his licensee. If the NLS device incorporates patented features which are owned by competing manufacturers, no single company will be able to bid to manufacture the NLS device without expecting to infringe the patents of an unsuccessful bidder. It may be expected that no single manufacturer will freely consent to the use of its patents, trade secrets and know-how so that another manufacturer can successfully bid to win the NLS contract to supply "cassette-Braille" devices to all of the blind in the United States and also capture the foreign market for the same product. On the other hand, if two manufacturers join together to allow one to bid successfully, or if they merge in order to make a successful bid for the NLS contract, there is good reason to believe that such action would violate the antitrust laws of the United States, since they would necessarily exclude every other bidder from the entire market by that action. It therefore appears that the present NLS approach to "cassette-Braille technology" may result in serious litigation between the manufacturers and NLS, which would certainly delay the production of any NLS paperless Braille display device for years. Congress would be reluctant to provide funds for a device that is the subject of litigation.

In my opinion, the most economical, most encouraging of technological advances, and most incentive offering approach to paperless Braille technology would be to have the NLS support inventive research and also the design, tooling and production of production model samples of paperless display devices wherever promising advances in technology appear and need production status. A few million dollars per year could accomplish wonders in that regard. The possibility that some devices might be superseded by newer technology while being built would not necessarily be disadvantageous. These devices might still be useful for specific limited purposes, and would be available for sale, because of

government funding, even though they would not necessarily be the ultimate equipment for general use. By so doing, the NLS would absorb the expenses of design, tooling and getting into production of demonstration units which ordinarily would have to be recaptured by heavy increases in the price of the first produced models. Demonstration units would be placed in regional centers and elsewhere where the literate blind could try them out and decide whether they wanted to buy them. The demand would be natural and immediate. The response could be equally immediate through the assistance of local agencies and community institutions. The best devices would be available at the earliest date and better devices would become equally available and supersede them as the demand dictated. Companies would not be deterred from investing in the production of paperless Braille display devices because the heaviest investment, in inventiveness, design and tooling, would have been taken from their shoulders. Their losses would be minimal if a newer device replaced their product. At the same time, however, they would be encouraged to continue supplying devices and to develop new devices and improvements since their knowledge of the market would be gainfully used if they worked at being the foremost technologists in the field. In contrast, what the NLS is now spending to store and protect its existing inventory of paper Braille, to administer its system and to do extensive so-called testing, encourages no one to enter the field or to improve the technology for the blind and, at the best, will result in making available essentially archaic equipment.

The present NLS testing program suggests that NLS is acting upon the unwarranted, untenable and unsupportable premise that "cassette-Braille technology" has peaked and cannot be improved upon, and that, accordingly, single-line, limited cell paperless Braille display devices are the very best that can be developed for or expected to be used by the literate blind. Furthermore, NLS is clearly implying to its test subjects that they must expect that conventional full-page paper Braille books and materials are going to become less available in the near future so their only hope for reading materials is to accept a one-line paperless Braille display in place of a full-page paper Braille display. This is false and misleading and NLS should not be suggesting that directly or subliminally. NLS knows full well that the current state of the art of "cassette-Braille technology" includes the capability of building a full-page, conventional Braille format, paperless Braille display device in a desk-top unit that will cost very little more than the currently tested single-line paperless Braille display units.

The Rose Braille Display Reader, our full-page paperless Braille display device, exists in operational prototype form after being built with funding from the U.S. Office of Education, Bureau of Education for the Handicapped. The Rose Reader was demonstrated to representatives of NLS at Washington, D.C. in May 1980. It was publicly demonstrated at the Helen Keller Centennial Conference at Boston in June 1980. In May 1981, the U.S. Patent Office issued a patent covering the Rose Reader. Foreign patent applications are pending and will probably be granted. A fair reading of the U.S. patent (Patent No. 4,266,936) and any brief viewing of the operation of the Rose Reader prototype unit should convince any reasonable person that current cassette Braille technology can build a full page paperless Braille display in a very small table-top unit, and can build even 100 character lines and more, if required.

For Braille to be the practical educational, vocational and recreational tool that is now desired so desperately by the blind community, it should be kept to minimum weight and size for easy storage and accessibility, while also providing as much conformity to existing standard Braille formats as possible, so as to minimize any need for retraining of the reading habits of blind users. I contend strongly that Braille must continue to be offered in a *full-page format.* Anything less is virtually useless and is certainly poorly oriented. The sighted cannot use inkprint efficiently without the full-page format that allows for speedy comprehension, general scanning, and an unstrained reading experience. This is true whether the reading is for educational or recreational purposes. The blind have similar needs for their reading materials in a Braille format.

It has been suggested that until Rose Associates has a "production" model, the various agencies will not recognize the existence of the Rose Braille Display Reader. A production unit, I submit, is one that has been manufactured by mass production techniques and tooling in large quantity. Every production unit should be capable of reliable error-free operation and should, in the rare instances when needed, be reparable easily and quickly. None of the units now being tested by NLS can meet these conditions. All of them are really pre-production "samples." The Rose Reader full-page prototype unit has established that the Rose Reader is operational. Our patent establishes its inventiveness. It is true that, as a prototype, it is not yet available to be subjected to NLS present testing procedure. Nevetheless, NLS has an obligation to disseminate information that a full-page "cassette-Braille" reader has been developed and that a full-page paperless Braille display device is feasible. When NLS ignores such demonstrated new technology, it is unfairly and arbitrarily suggesting by omission that the technology does not exist and can never exist. Certainly, the general refusal of NLS to mention the Rose Reader in its publications about paperless Braille technology, and to mention it only negatively if it is mentioned at all, is a disservice to the blind and to those seeking to improve their condition.

If NLS will examine its mission carefully, I believe it can reach no other conclusion but that its present emphasis on time-consuming testing and on a cassette Braille machine with NLS precise specifications is misguided. NLS should shift its program to encourage, not stifle, new technology from every possible source and thereby meet its goal to free many blind persons from an unnecessary dependence on NLS while simultaneously providing the blind with Braille that is comparable to inkprint for the sighted in quantity and usefulness.

This is a long letter because Rose Associates, Inc. has long been silent about this subject. I respectfully suggest that this letter raises important current issues that require consideration, discussion and careful analysis by all persons, groups, agencies and institutions that serve the blind, including NLS. NLS *Facts* is an ideal vehicle for the dissemination of this letter, because NLS *Facts* has raised the issues and has presented some third-party views on the subject. It is only fair and proper that Rose Associates, Inc. be given equal time. NLS should certainly have no bias in favor of a single view of the subject, and ought to have an affirmative interest in promoting a serious exchange of ideas among its readers. I look forward to seeing a copy of this letter sent to NLS *Facts* readers and hope that my letter will stimulate a response which will provide an indication of how others feel about this subject.

Thank you for your cooperation.

Sincerely,
Leonard Rose, President
Rose Associates, Inc.

Washington, D.C.
November 25, 1981

Dear Mr. Rose:

I reviewed with great care your detailed letter of November 9, in which you raised several points about the cassette Braille evaluation and related matters. I have discussed the letter with Kurt Cylke, Director, and Henry Paris, Chief, Materials Development Division.

We invite you and your engineering staff to make a presentation about the Rose Reader at our offices; to bring us up to date about refinements since the demonstration in May 1980; to discuss technical improvements under way and the reliability level of the Reader. In turn, we shall go over our program in the area of cassette Braille including our immediate needs.

The group involved in the demonstration-discussion would include members of the administration, engineers, Braille experts, and consumer representatives.

Please call me at your earliest convenience to suggest one or two days when you and your party can visit NLS.

Sincerely yours,
Richard H. Evensen
Project Coordinator
National Library Service
for the Blind and Physically
Handicapped

Falmouth, Massachusetts
December 4, 1981

Dear Mr. Evensen:

Thank you for your reply of 25 November 1981 to my letter of 9 November 1981. Before responding to the invitation in your letter, I would first like to make certain that the original purpose of my letter of 9 November 1981 has been achieved.

My letter was primarily a response to an invitation to NLS *Facts 5* (September 1981) to react and to comment about the letters from Dr. Bliss and Mr. Carbonneau concerning data which appeared in NLS *Facts 4* (June 1981). I asked you to give my letter of 9 November 1981 the benefit of equal time and opportunity to be heard, in the form of an attachment to the next issue of NLS *Facts* when it is sent to its usual list of recipients. Your letter of 25 November 1981 did not respond to this request. I will appreciate a specific reply which promises that NLS will indeed attach my letter of 25 November 1981 to the next issue of NLS *Facts* when it is sent to its usual list of recipients. I feel that my comments were fair and to the point, and feel that they should be disseminated to the same degree as those of Dr. Bliss and Mr. Carbonneau so that there will be an opportunity for public consideration and public judgments on those issues. I look forward to your early reply in this regard.

In respect to your invitation to visit NLS and to make a presentation about the Rose Reader, before replying I think that I should first supply you with information that I now can reveal because we are now protected by a U.S. patent and pending foreign patent applications. I enclose a copy of our U.S. patent for review by your

engineers. It is self-explanatory.

The Rose Reader dot mechanism is based on the principle that different metals expand at different rates when heat is applied to them. A common thermostat which regulates heating and air conditioning units uses such a principle. If two dissimilar metal strips are bonded together and are heated, the combined strips—which we call a bimetal strip—bend into a curved shape. When the bimetal strip cools, it returns to its former flat shape.

We created a Braille dot mechanism by placing a metal spring in a hole drilled in the narrow edge of a dot assembly board. We inserted a long pin into the hole on top of the spring. We formed a small lip or flange on the shaft of the pin at its upper part outside of the hole. As these parts function in combination, the pin is always being pushed upward by the spring. A force in a downward direction against the pin head compresses the spring, so that the pin can be lowered a very small distance. We placed a top surface above the pin. This surface has holes which permit the pin head to protrude when the spring is not compressed. When the pin is forced downward, compressing the spring below it, the pin head is at a point where it is at the level of the surface, filling the hole so that the reader feels a flat surface.

The problem for all developers of paperless Braille display readers was to invent a way to control raising and lowering of the pin at the surface of the display. Until now no one knew how to build a dot mechanism that was small and compact enough to allow 6300 dots to be displayed in the area of a conventional Braille page. We achieved this by placing a very small, flat bimetallic strip next to the shaft of the pin where it extends upward outside of the hole in the dot assembly board. We formed a small lip at the top of this strip, in a shape that would be able to lock onto the lip or flange that we made on the shaft of the pin. This bimetallic strip is about as wide as the pin and is very thin, but it is very strong and durable. However, it also has the extra characteristic that when electricity is conducted through it, it heats up and bends to a predetermined specific degree. This permitted us to use the bimetallic strip to latch with the shaft of the dot pin when it is cool, and to bend away from and thus unlatch the shaft of the dot pin when heated. We arranged the relationships in such a way that the pin can be latched when it has been forced downward, compressing the spring. By so doing, it became possible to display a dot simply by passing a very small electric current through the bimetallic strip related to that dot. The strip heats up and bends away, thus releasing the pin. The spring below the pin immediately forces the pin up and holds it there indefinitely. As soon as the electricity is cut off, the bimetallic strip cools and returns to normal, where it is ready to relatch the pin as soon as it is forced downward again. We simply lower the entire top surface a very short distance to accomplish this, which forces all of the displayed pins to relatch, leaving a blank surface ready for a new display. By selectively controlling the electricity to the individual bimetallic strips connected to each dot, we can display any dots that we want.

So, now you can see that the most important inventive part of our Rose Reader uses only a very simple group, consisting of a pin, a spring, and a flat bimetallic strip. There is virtually almost nothing that will go wrong with the pin or the spring under most use and even most abuse. The very simplicity of the dot mechanism is the greatest assurance of reliability. The bimetallic strips are well-known to industry and can be purchased with specifications

that are reliable far beyond the demands of the Rose Reader. We have exercised the Rose Reader mechanisms for tens of thousands of times without failures. Since it is obvious that no full-page display shows all of the dots on every displayed page, the variations in the dots actually displayed on each page result in only moderate use of any individual dot mechanism even under constant heavy reading usage by any blind person.

We have also designed a way to manufacture the dot mechanisms so that an entire vertical line (from top to bottom of the page) of dots can be built at one time to be contained on a single long narrow board which can be plugged inside the Rose Reader. This means that if any accident occurs which requires a Rose Reader to be repaired, we can simply pull out the individual dot assembly board that contains the damaged dot mechanism and plug another board in its place. The Rose Reader can immediately be returned to the owner in a completely repaired condition, while we fix the broken assembly later at our convenience. Since each Rose Reader is made up of a number of identical dot assembly boards, repairs will be simple and large quantities of spare parts will not be required. Virtually any competent electronic appliance repair shop will be able to serve as a local repair shop for a Rose Reader, so repair procedures will be nominal and will be widely available.

With the above explanation, you now may see that there will be no significant problem if we desire to have a paperless Braille display with 80-character lines. We simply add more dot column assemblies alongside the assemblies of the present display. A few software, hardware, and power supply changes would be necessary, of course, but all of that would be ordinary state of the art engineering. By designing such an 80-character line display, we would be able to make the Rose Reader into a paperless Braille display for any conventional computer or word processor, with a Grade One Braille display if necessary. Of course, Grade Two Braille would also be available in the same display. It should not take much of an interface to permit a blind person to have access to a video terminal which is being used by sighted persons, and with the Rose Reader the blind user could have complete direct access to computer data banks for the sighted.

We are also mindful that the volunteer Braillists ought to have a place in the field of paperless Braille. We have already developed a substantial part of a system that will enable the volunteer transcribers to continue to share in the effort to supply Braille to the blind. Instead of a standard Perkins Brailler, our system will combine a simple electronic Braille-format keyboard, a "black box" with a cassette or floppy disc drive, and the Braillist's own home television set. The "black box" will connect to the television set by a simple spring clip to the antenna on the television set or by the connectors now used to connect video game sets to home TVs. The Braillist will type in Braille form on the keyboard, and the Braille will appear on the television screen. The "black box" will have editing capability, so errors will be corrected electronically while the display is still on the television screen. The Braille data will also be stored (and corrected) on the cassette tape or floppy disc. When the work is done, the Braillist will mail the cassette or disc to us or to any other control center where it will be proofed and copied. It will be possible at that stage to proofread the work of the volunteers either visually or tactilely. Further editing will also be possible at that point. Electronic copying will be simple and relatively inexpensive.

To complete the development of this system will require funding of about $40,000 and about eight months of time. If we obtain the funding that we need to build production units of the Rose Reader, we expect to complete this system within that funding.

Of course, you can understand that the development of the above system will also provide us with a keyboard for Braille input by a blind user of the Rose Reader. It would be wasteful to design a simple Braille input keyboard for the Rose Reader alone, when the same engineering could also be devoted to the system that will allow volunteer Braillists to continue their good work.

Finally, in order to avoid wasting your time and ours, I tell you now that, as you probably know, there are no present developmental efforts that are ongoing to design and tool up to build production units of the Rose Reader. We are confident that the concepts that have been implemented in the prototype unit of the Rose Reader that you saw in 1980 can be readily refined into a smaller, lighter, far more sophisticated, highly reliable production model. However, the engineering and technical staff that we used to build the prototype would not be qualified to design and build the tooling for a production model. In order to get into production, we must employ an engineering and technical staff that is competent to do that job. That means that we have to attract needed professionals by offering them appropriate salaries and by promising to employ them for at least two years. In order to do this in a prudent manner, we must be assured that we have in advance all of the funding that we need for the purpose. If we started with limited funds which later ran out, we would lose our staff and the knowledge and know-how that had been generated. If new funding was later obtained, a significant part would have to be used to train new staff in what had already been done. Therefore, it is our intention not to proceed until we first have full funding for the project of designing and tooling up to build Rose Readers. We are in the process of seeking out such funding from public or private sources.

That brings me to your invitation to make a presentation to NLS. I must assume that your invitation is a response to the substance of my letter of 9 November 1981, in which I suggest that NLS ought to help to make new technology available to the blind and deaf blind. I must assume also that you would expect Rose Associates, Inc., to make a presentation which would, in essence, be a proposal for funding by NLS to the end that the Rose Reader would be put into production with all of the refinements and improvements that NLS feels ought to be in such a paperless Braille display device. I assume also that the invitation is not for a "show and tell" presentation, and that we are not being asked simply to demonstrate the Rose Reader again so a few more people can see it operate. We will certainly bring dot column assemblies with us, so that the dot mechanisms can be seen and understood within the context of discussions about designing and planning to tool up for production, but we would see no value in a meeting at which the primary purpose was to have people take turns actuating Braille displays on the Rose Reader. We would also see no value in a meeting devoted to discussing at length the design or operation of the Rose Reader prototype. Since the production model of the Rose Reader would be a substantially refined and far more sophisticated device than the prototype, there is no point in analyzing the prototype endlessly. The only crucially

inventive part of the prototype is in the dot display mechanism. The logic circuits, the data storage and delivery components, the data and page search components, and the power supply are all state of the art components. They do not represent the highest current state of the arts in all respects, they can be improved on so that the Rose Reader is smaller, lighter, faster, and more versatile. With more sophisticated microprocessor and software components, a capacity for continuous refinements can be incorporated into the device. There would be no point in devoting a meeting at NLS to a discussion of the limitations of the prototype Rose Reader in its state of the art features. The production models can have any features NLS desires for them within the latest state of the art. The paperless Braille display feature can be adapted to any required feature that has practical value.

We estimate that a refined, sophisticated Rose Reader, with Braille keyboard and with computer terminal interface capability in a production model can be designed and tooled up for with about $1,000,000 of funding over a two year period. If that cost must be carried by private investment capital, the price of the first production models of the Rose Reader will be high. If the cost of designing and tooling for the production model is absorbed by public funding, the Rose Reader is expected to be made to sell for less than $7,500.00.

If your invitation to Rose Associates, Inc., is intended to open a dialogue about the manner in which NLS can help to provide the needed funding and about the refinements and improvements to the Rose Reader that NLS would want to have developed as part of the use of the funding, we welcome such a dialogue and we will call you to arrange an early meeting at a mutually convenient date and time. Such a dialogue was suggested in my letter of 9 November 1981. I look forward to hearing from you that that is the intention and purpose of your invitation, and will also appreciate it if you will prepare and send me an agenda for such a meeting so that the time can be used efficiently for the greatest benefit.

I await your early reply.

Sincerely,
Leonard Rose, President
Rose Associates, Inc.

Washington, D.C.
December 17, 1981

Dear Mr. Rose:

I am writing in response to your letter of December 4, 1981, to Richard Evensen.

Your comments of November 9 and December 4 regarding the Rose Reader and the National Library Service for the Blind and Physically Handicapped activity are of interest. They have been examined by the staff and will add to our knowledge base.

Your letter of November 9 will not be sent to readers of *Facts*. It was never our intention to promote or otherwise advertise related technological applications that have not been demonstrated as reliable.

Further, we are not in a position to support development of a "refined, sophisticated Rose Reader." The lack of reliability of the early reader, combined with projections of our engineers, causes me to reject such a proposal. The probability of success is low and your projected cost too high.

Our reason for suggesting a meeting was noted in Richard Evensen's letter to you of November 25. Based upon your comments I agree that there is no need to get together immediately.

Sincerely yours,
Frank Kurt Cylke, Director

National Library Service for
the Blind and Physically
Handicapped

Falmouth, Massachusetts
December 23, 1981

Dear Mr. Cylke:

I have your letter of 17 December 1981. You surprise me by your intervention in an exchange of correspondence between Mr. Evensen and me. I thought that Mr. Evensen had more authority and discretion within the scope of his official responsibilities. However, you surprise me even more by the tone and substance of your letter, and I truly hope that they are due to your lack of understanding of the subject matter of my correspondence, because if you really understand the import of your remarks there may well be charges of impropriety and bias that may be levelled at NLS and which should be the subject of an investigation by Congress.

For the record, may I remind you that in addition to being chief executive officer of Rose Associates, Inc., I am also chief executive officer of its sister company Braille Inc., which is a professional Braille transcribing and publishing company which sells its services and publications to agencies and blind clients throughout the world. Braille Inc. regularly transcribes Braille literary, music, math, technical, legal, educational and vocational materials that are as complex and as difficult to transcribe as any materials published by NLS. Quite often, Braille Inc. is asked to provide the materials because no public agency has been able to provide them accurately and within the short time frames that are needed. There can be no doubt that Braille Inc. can deliver such materials within weeks after an order is received, which is usually several orders of magnitude faster than NLS or any other volunteer agency can deliver. The principals of Braille Inc. are the principals of Rose Associates, Inc., and the expertise of either company is available to both. Therefore, in corresponding with NLS and in making comments about NLS programs, we are entitled to be recognized as experts in the field of Braille transcribing and publishing. We are not gadflies. We have a substantial and legitimate interest that we pursue and speak for, and we are entitled to respectful consideration and evenhanded treatment from government agencies in their dealings in this area of responsibility.

I remind you also that Dr. Bliss is chief executive officer of Telesensory Systems, Inc., and Mr. Carbonneau is chief executive officer of Triformation Systems, Inc. Those two companies and Rose Associates, Inc. are each for-profit corporations that are competing to supply NLS with "cassette Braille" devices. Since NLS has not developed specifications for the cassette Braille device that it intends to purchase and NLS has publicly stated that it will not purchase any of the existing devices, it is clear that the three companies apparently have an equal opportunity to bid to sell to NLS. Of course, in such circumstances, if NLS is persuaded to develop specifications that conform to the specifications for an existing device to a large extent, the company that manufactures that particular device will have a distinct advantage in bidding because it will have the least retooling costs of all potential bidders. It is, therefore, of critical concern that NLS exercise great care before drawing up specifications for its device. The adverse comments of competitors should be fully disclosed and published in NLS records, so that there will be no doubt that NLS acted fairly when

arriving at its final specifications for its device. NLS has a governmental responsibility to act fairly, impartially and in an evenhanded way.

NLS in *Facts* published the letters of Dr. Bliss and Mr. Carbonneau on the subject of the ongoing NLS cassette Braille testing program. The NLS testing program has used some of their companies' cassette Braille devices. The information that Rose Associates, Inc. has is that the units of both companies that were tested did not perform reliably and that the tests themselves had to be altered in order to derive any basic data at all. Mr. Evensen, in that issue of *Facts,* invited readers to comment about the letters of Dr. Bliss and Mr. Carbonneau, and Rose Associates, Inc. accepted the invitation and responded by my letter of 9 November 1981. As a chief executive officer of a competitor company, I had a right to expect that my letter would be given equal time and evenhanded treatment by NLS, especially where my response had been invited. My letter contained fair and relevant comment and NLS has a duty to make it public to the same extent that it published the remarks of two competitor companies. If NLS fails to publish the comments that it invited, it will create the erroneous impression that there are no views which differ from those of Dr. Bliss or Mr. Carbonneau, or those of NLS that have been received in response to the invitation of *Facts.* The public and the Congress will be deceived by NLS' action in covering up dissenting adverse commentary. This will unfairly benefit the companies of Dr. Bliss and Mr. Carbonneau, to our detriment. I see this as a clear impropriety on the part of NLS.

As to the substance of your letter of 17 December 1981, when you say that it never was NLS intention to promote or otherwise advertise related technological applications that have not been demonstrated as reliable, I must challenge that statement. NLS has given publicity and has "advertised" the existence of a variety of cassette Braille devices long before NLS had any hard data about the reliability of those devices. As a matter of fact, the present testing of the cassette Braille devices of Telesensory Systems, Inc. and Triformation Systems, Inc., has shown NLS that those devices have not yet reached a stage where they can be said to be reliable. I understand also that the Braillocord devices which were supposed to be included in the testing were so unreliable that they could not be sampled. Yet, NLS purchased all of these units for its tests and continues to give publicity to them in the face of clear-cut evidence that they are all only preproduction demonstration units at best, with minimal reliability. While I cannot say that I have seen hard data records to support my view, I suggest that there is a great probability that NLS records of its testing program disclose a large number of breakdowns of all of the models being tested. Unless you can demonstrate otherwise, I respectfully suggest that "lack of reliability" should not be a standard that you ought even to raise as a basis for refusing to publish my letter of 9 November 1981.

I think that it is important that I dispute your unwarranted statement that the Rose Reader is unreliable. Since no one at NLS, including you personally, has made any formal or informal tests to evaluate the reliability of the Rose Reader, you are not entitled to make such a statement. It appears that you have formed such a judgment on the basis of a casual "show and tell" examination which either you or some of your NLS colleagues may have made when we publicly demonstrated the device. You apparently found the display unintelligible, and from that perceived unintelligi-

bility you formed the conclusion that the device was unreliable. That merely marks you and your colleagues as naive and unqualified to make such judgments. There was no way that anyone could have determined the reliability of the Rose Reader from reading its display.

If you had any engineering or technical training you would realize that the intelligibility of the display was derived partly from the intelligibility of the data on the tape that was used with the machine. If the tape contained a random dot display which would merely have exercised the dot-actuating mechanisms to show reliability, that would have demonstrated reliability. To display intelligible data might never exercise some dot-actuating mechanisms, particularly those at the ends of lines, because of the probability factors which determine how often a dot is used in word displays. A test of reliability must be conducted in a way that assures that all dots are tested to the same extent. We made such tests and found complete reliability.

In the case of the Rose Reader prototype that was demonstrated, as is the case with all prototypes, it was built by hand. In the rush to assemble the device finally for public demonstration, about 200 dot-actuating mechanisms (i.e., bimetal strips) were damaged during handling, so that those mechanisms could not latch their dots in a nondisplayed mode. This meant that scattered through the display were a total of 200 dots that always appeared. These dots necessarily corrupted the display by creating unintelligible characters or by creating readable characters that did not belong where located. These, in turn, corrupted contractions which corrupted words and sentences. But these corruptions always occurred in the same place every time. All of the other dot-actuating mechanisms operated reliably. We made a decision to bring the Rose Reader prototype to the public demonstration to show that such a device existed and was operative, preferring to explain why the display was not intelligible than to avoid giving the demonstration. You apparently decided that the intelligibility of the display demonstrated unreliability of the mechanisms. Any competent engineer would tell you otherwise. Prototypes are intended to demonstrate the validity of concepts and general inventive designs; they are not intended to serve as preproduction demonstrators. The Rose Reader prototype clearly has demonstrated feasibility and reliability. It never was intended to demonstrate intelligibility of the display. Intelligibility will be a by-product of building the production model.

Finally, I cannot imagine how NLS engineers could have made any valid projections about anything concerning the Rose Reader. No NLS engineers have ever seen our designs, and they are not disclosed by the patent drawings. Moreover, in order to build production model Rose Readers the issue is the design and building of *manufacturing tooling* which will be used to make and assemble the Rose Reader by mass production techniques. Those designs have nothing to do with the design of the Rose Reader, and they involve only state of the art engineering. I do not understand how your engineers could have given you any opinions about the Rose Reader. I would question them again, if I were you.

I find it to be curious, indeed, that NLS has shown such a negative interest in the Rose Reader. You have had strong evidence of inventiveness and utility in the form of the U.S. patent. You have seen the device operate, and even if it were presently unreliable—which it is not—it would be worth much to invest some funding to

make it reliable. A full-page cassette Braille display is obviously better than a single-line display that requires extensive retraining of reading habits. Where the Rose Reader exists, why has NLS refused even to discuss it publicly beyond a rare negative comment which is based on an extremely limited contact with the device? I suggest that NLS is in derogation of its charter by its negativism. The amusing aspect of it all is that it represents a replay of the old story of the emperor who refused to recognize that he was wearing no clothes. NLS cannot avoid the impact of technology by refusing to talk about it, nor can NLS conceal the advances in technology by refusing to publicize them. If NLS does not join the march of progress, it will simply be left behind, because too many people have a need for that technology.

Again, I repeat my request. Will NLS publish my letter of 9 November 1981 in *Facts?* I will appreciate an early reply.

Sincerely,
Leonard Rose, President
Rose Associates, Inc.

Washington, D.C.
January 6, 1982

Dear Mr. Rose:

I am writing with reference to your letter of December 23, 1981. A review of the situation should place any differences in perspective.

Richard Evensen is a middle-level staff assistant here at the National Library Service for the Blind and Physically Handicapped. His major responsibility is monitoring our research and development efforts, including paperless Braille. Related to this on November 25, 1981, Mr. Evensen invited you to make a presentation of the Rose Reader to the point of bringing our technical and administrative staff up-to-date regarding reliability and technical improvements. Your December 4 response suggested a meeting to discuss the "manner in which NLS can help to provide the needed funding." This is outside Mr. Evensen's sphere of concern within our operation.

Based upon comments of Henry Paris, Chief, Materials Development Division, and Richard Evensen, i.e., "The lack of demonstrated reliability of the prototype reader, the lack of portability, and a unit cost projected to be outside of the range considered feasible for the NLS program;" we are not interested in funding development of the Rose Reader nor, until you have production models available, will we consider your participation in an evaluation program.

Please know that our willingness to receive a presentation regarding the Rose Reader is open; however, it cannot be tied to funding.

Sincerely yours,
Frank Kurt Cylke, Director
National Library Service for
the Blind and Physically
Handicapped

Falmouth, Massachusetts
January 11, 1982

Dear Mr. Cylke:

I have your letter of 6 January 1982, and I remain in a quandary about how to make you understand what was the basic and primary topic of the correspondence between me and Mr. Evensen before you and he managed to raise and get involved with extraneous matters which you still persist in discussing.

Perhaps I can clarify and place a limit on

our correspondence by stating unequivocally that Rose Associates, Inc., has not applied for and is not now applying for any kind of funding from National Library Service. Please disabuse yourself of the notion that we are asking for money from NLS.

Let me state with equal lack of equivocation that Rose Associates, Inc. has not applied for and does not seek to make any kind of presentation to NLS in respect to the Rose Reader. Your Mr. Paris' irresponsible comments about the reliability, portability and unit cost of the Rose Reader before he has tested or obtained any hard data about the device are simply more evidence to prove that NLS testing and evaluation procedures in respect to new cassette Braille technology are too primitively subjective and unscientific to constitute any kind of proper accrediting methodology for such devices.

Now that you have been told that we do not seek your funding and we do not seek to make a presentation to you, please try to understand what we do want. We want to have my letter of 9 November 1981 published in full in the next issue of *Facts*, and we want that because we were invited to prepare and send in our comments. We wish to have our comments in my letter given equal time and publication opportunity as the comments given to our competitors, who have had their letters published in *Facts*.

Let me try to make it absolutely and abundantly clear what my subsequent letters to Mr. Evensen and you have been about: We want to have my letter of 9 November 1981 published in full in the next issue of *Facts*, and we want that because we were invited to prepare and send in our comments, and we wish to have our comments given equal time and publication opportunity as the comments given to our competitors, who have had their letters published in *Facts*.

In order that there may be no residual uncertainty about my meaning, I am aware that there has been other correspondence between myself and NLS after the date of my letter of 9 November 1981. I do not seek to have any of that correspondence published in *Facts*. My letter of 9 November 1981 was a special commentary which was solicited by Mr. Evensen, and it is entitled to publication. The subsequent correspondence was not solicited in *Facts* and I, therefore, do not seek to have them published in *Facts*. Therefore, I reiterate: I wish to have my letter of 9 November 1981 published in full in *Facts*. No other topic of discussion is now open between us. Please respond to that request and no other. If I have to go to my congressmen and senators and to the GAO to obtain compliance with reasonable practices and procedures, please understand that I will do so. As a practicing attorney with thirty years of experience, including much experience in dealing with agencies that have forgotten what their purposes are, I assure you that I will make it a serious issue if NLS persists in stonewalling rather than in serving the public interest. The public interest will be served best if the issues raised in my letter of 9 November 1981 are read and are discussed by the readers of *Facts*. NLS needs to have more public scrutiny of its activities and methods. You, Mr. Cylke, should have no personal or official interest in preventing such a scrutiny.

I would like an immediate response: Will NLS publish my letter of 9 November 1981 in the next issue of *Facts?* Your answer in writing is requested.

One more point: It appears that interested persons have requested to have copies of my letter of 9 November 1981 and subsequent correspondence with NLS from

you. Please be advised, I claim no privilege or right of privacy and I specifically disclaim and give up all rights and privileges of privacy and confidentiality in regard to such correspondence. Under the Freedom of Information Act, you are free and I encourage you to provide copies to anyone upon request. NLS should not refuse on grounds of privacy to provide copies to any interested party.

I await your answer. Will you publish my letter of 9 November 1981? I hope that we have narrowed the correspondence to this question alone.

Sincerely,
Leonard Rose, President
Rose Associates, Inc.

Washington, D.C
February 9, 1982

Dear Mr. Rose:

I have your letter of January 11. I have discussed its contents with Messrs. Evensen and Paris, as well as with the General Counsel, Library of Congress.

In response to your request that NLS publish your November 9 letter, I wish to advise you that, as stated in my letter of December 17, we do not plan to publish your November 9 letter in *Facts*. You are correct in stating that Mr. Evensen invited comments to the remarks of Messrs. Bliss and Carbonneau published in *Facts 5*. That invitation did not include a promise to publish comments received. No other letter writer has asked for nor been granted publication of comments.

We have your comments on the evaluation and thank you for them.

Sincerely yours,
Frank Kurt Cylke, Director
National Library Service for
the Blind and Physically
Handicapped

Falmouth, Massachusetts
February 12, 1982

Dear Mr. Cylke:

You have not responded to my letter of 11 January 1982. I will appreciate a response by return mail.

In reviewing the situation, I note that NLS printed the letters of Dr. Bliss and Mr. Carbonneau specifically in response to their requests. Rose Associates is entitled to the same treatment. I trust that upon reflection you will agree.

Sincerely,
Leonard Rose, President
Rose Associates, Inc.

BRAILLE: A BIRTHDAY LOOK AT ITS PAST, PRESENT, AND FUTURE

by *Jim Burns*

For all practical purposes, the year 1975 marks the one hundred and fiftieth anniversary of the birth of the Braille system of embossed writing. Its life, though relatively short, has been a stormy one. Just as most inventions do not come in a single flash of intuition, Braille had a rather painful gestation period. This was followed by an unfortunately neglected childhood. Then came an adolescence fraught with strife before contending factions finally allowed Braille to ripen into the mature, universally accepted system used today.

In the early 1800's when Louis Braille became a student at the Royal Institution for Young Blind in Paris, there were in existence over 20 different systems of embossed type.[1] At this school the studious young Braille could choose from among a collection of only 14 books printed in a system of large italic Roman letters in relief. This had been invented by Valentin Hauy, the founder of the school, and not surprisingly was the accepted mode of reading there. However, as was the case with most of the other existing methods of printing for the blind, Hauy's was a slow, cumbersome way to read. Each character had to be tediously scanned to be recognized and then each had to be slowly built onto those coming before and after to form words. In addition, it did not provide a means of writing for the blind.

In 1821 Charles Barbier, an artillery captain in the French army, visited the school. Two years earlier he had invented a system of writing by dots based on phonetic principles. Called "night writing," it had originally been meant for use by soldiers on the field of battle at night. Barbier had then improved it, renamed it Sonography, and taken it to Dr. Guillie, head of Braille's school. Guillie had expressed concern as to the complexity of the invention (words were not spelled out, but were written phonetically; the great many dots often required for a single word made deciphering a lengthy process). Thus it was not until the undaunted Barbier's second visit to the school that the system was introduced to the students.

Louis Braille eagerly learned Sonography but soon became aware of several flaws in it. No attention was paid to conventional spelling because of the phonetic emphasis; there was no provision for punctuation, accents, numbers, mathematical symbols, or music notation; and the complexity of the combinations made reading difficult. At first Braille sought mildly to modify the system, but after a meeting with an obstreperous Barbier, the 15-year-old schoolboy decided to concentrate on devising a completely new method of dot writing.

Braille worked intensively on his invention. By 1825 he had, among other things, cut Barbier's 12-dot cell in half, and his system was more or less complete.[2] In 1827 parts of the *Grammar of Grammars* were transcribed in Braille, and in 1828 Braille applied his brainchild to music notation. Finally, in 1829 he published his *Method of Writing Words, Music, and Plain Songs by Means of Dots, for Use by the Blind and Arranged for Them.* He followed this in 1834 and 1837 with yet improved

versions of his method.

The Braille system was eagerly seized upon by blind students in Paris. However, it had to combat resistance from the old guard of sighted teachers who criticized the use of an alphabet whose configurations were so different from those of print. After all, the sighted teachers could not easily read it. Braille was also criticized on the ground that the use of such a different mode of reading "set blind people apart" from others. The fact that near illiteracy due to the failings of the preferred systems of embossing tended to set blind people apart from others was overlooked. Thus Braille was for years largely ignored by teachers of the blind, and it was not until 1854—three years after Braille's death—that his own alma mater officially accepted his system. Likewise, it was not officially recognized anywhere in the United States until the Missouri School for the Blind adopted it in 1860, and Braille was not extensively used in Great Britain until after 1868.

In the United States, Braille had not only to weather competition from embossed letter systems such as Moon Type and Boston Line Type, but it also underwent a long period of internecine warfare. A few used the French arrangement. Others used Joel W. Smith's American Braille, a modified form of the original system in which the most frequently occurring letters were given the fewest dots. Yet others preferred New York Point, a more radical change by William Bell Wait making the cell horizontal instead of vertical, two dots high and from one to four dots wide depending on the width of the letter represented. All of these had their advantages and disadvantages. The economy of dots in American Braille made writing by hand easier. New York Point saved more space and made reading speedier, but had such a cumbersome method of forming capitals, apostrophes, and hyphens that these punctuation marks were rarely used. The French version was bulkier but offered uniformity with Great Britain and most of Europe. Therefore, while New York Point was officially recognized by the American Association of Instructors of the Blind in 1871, all three forms were used.

This conflict—the War of the Dots—resulted in the need to produce such widely used books as the Bible and popular textbooks in three forms. It also made it difficult for blind persons brought up on different systems to communicate. This situation lasted until 1918 when a revised version of the original French system was adopted. However, the agreed-upon form—Revised Grade 1½ Braille—still differed from the more heavily contracted Grade 2 system used in the United Kingdom. More committees were formed, more meetings were held, more speeches were made, until a speaker at one of the ensuing national conventions was moved to suggest: "If anyone invents a new system of printing for the blind, shoot him on the spot."[3] At last, in 1932, with no new systems devised and no known fatalities, an agreement between the United Kingdom and the United States established Standard English Braille, Grade 2 (a compromise heavily favoring the British version) as the contracted form for everyday use in English-speaking countries.

In the meantime Frank Hall had invented the Braillewriter to speed up the hand copying of Braille (1892); and in the same decade, he had invented the Stereograph used to emboss the zinc plates for the production of press Braille. By 1932 further improvements had been made in both of Hall's inventions. Braille was finally free to mature and develop to its true potential.

Now, 150 years after Louis Braille devised the system that was used by only a few Parisian students, it is used by approximately 45,000 Americans alone, and perhaps twice that number are able to read it but do not do so regularly.[4] Several printing houses in the United States and abroad produce Braille on Braille presses. At least 8,000 certified volunteer transcribers in the United States are at work invaluably supplementing the relatively few titles that can be produced annually on the Braille presses.[5] In addition, work continues at the Royal National Institute for the Blind in Great Britain and elsewhere on solid-dot Braille, a method of printing Braille in which heat-sealed plastic dots are deposited on the surface of thin paper, resulting in uncrushable dots that are reduced in bulk by 45 percent. Continuing exploration is also being made into computer-produced Braille and other new means of mass production. Teachers of Braille continue to experiment with new teaching methods, and many hope that further perfections will be made in the code itself.

What then of the future of Braille? There are some who say that the number of Braille readers is declining and will continue to do so because of continuing advances enabling the blind to read ordinary print (the Optacon, Stereotoner, CCTV systems, and so on) and because of steady improvements in recorded media. One must pause though when confronted with the astronomical costs often involved in purchasing a CCTV system, the Optacon, or a Stereotoner (some of these devices start in the hundreds of dollars and range up to as much or more than $3,000); when one considers the hardware involved in using all of these electronic devices; and when one considers a potential reading rate that is usually considerably less than that of a good Braille reader. Likewise, Braille is superior in many ways to recorded media. Certain subject areas such as mathematics, some of the sciences, and foreign languages in which more than pronunciation is stressed practically dictate the use of Braille. Only with difficulty can a person skim or skip from place to place while using recorded media, and a person's reading rate is limited by the speed of oral speech.

It is desirable and right that the use of Braille continue for another reason that is less tangible than the foregoing but of equal or even greater importance. If a blind person does not read or write Braille, he will remain that much less independent. If he cannot read Braille, he will remain dependent on sighted readers or recordings. If he can neither read nor write Braille, he cannot label cans, boxes, cartons, and the like in his kitchen, bathroom, or shop. He cannot take down simple notes, addresses, or telephone numbers. Stated simply, Braille increases independence—a value that far transcends its worth just as a reading/writing tool.

So Braille should and will remain with us. It is an integral tool—as are recorded media and as the new technological innovations can become—in the increasingly successful struggle of the blind to surge forward and take their proper place in the mainstream of society. The fruits of the labor of a blind Parisian teenager 150 years ago must certainly be considered a landmark discovery helping to facilitate this march to independence.

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[1] Donald Bell, "Reading by Touch," *The Braille Monitor*, June 1972, p. 295.

[2] *Ibid.*

[3]Robert B. Irwin, "The War of the Dots," from *As I Saw It*, by Robert B. Irwin (New York: American Foundation for the Blind, 1955), p. 47.

[4]Louis Harvey Goldish, *Braille in the United States: Its Production, Distribution, and Use* (New York: American Foundation for the Blind, 1967), p. 10.

[5]Telephone conversation with Maxine Dorf, Division for the Blind and Physically Handicapped, Library of Congress, Washington, D.C., January 24, 1975.

BRAILLE: A COMEDY OR A TRAGEDY?

by *Ramona Walhof*

There is a play by William Shakespeare called "A Comedy of Errors," and the play lives up to its title. I am reminded of this play when I am confronted with attitudes toward Braille and all the problems—real and unreal—that are attributed to Braille. But there is an important difference. The misconceptions and misdirections that cause the use of Braille to be shrinking instead of expanding are not in the least bit funny. And this is happening at a time when technology exists to produce Braille in more ways than ever before.

We are told that libraries for the blind have very few borrowers who use Braille. Because there are so few, the National Library Service for the Blind and Physically Handicapped of the Library of Congress has decided that fewer libraries should circulate Braille. Four multi-state centers will have complete Braille collections. Some other libraries will have a little Braille; and some, none at all. This means that a Braille book which is located in the multi-state centers can only be circulated after substantial delay. Furthermore, it means that librarians and their staffs who receive requests for books will not generally know whether or not the books are available and when. It is and must be an inefficient way to circulate books. In addition, the library network for the blind as it currently exists is largely staffed or understaffed with individuals who have little or no training or experience in library service. In many libraries for the blind the philosophy has been and continues to be one of providing a charity, rather than giving service. Of course, charities often do give valuable service. However, the philosophy does not foster consistently good service.

In other words, in a system that is struggling to handle a growing work load to provide library service to the blind and physically handicapped, a system which often cannot do what is needed to serve many of the individuals who need and want this service, Braille has been pushed aside. The multi-state centers in theory may make more books available to more people. In reality, they are cumbersome to use and many borrowers do not know how to use them. Numerous regional—and especially subregional—library staff members do not really know how to use multi-state centers. It is not surprising that the circulation of

Braille has not been helped by this system.

When people ask me how to get Braille materials on a regular basis, I recommend Braille magazines. Of course, this does not solve the problem described above. However, it should be noted that it is possible to receive Braille magazines regularly and that these magazines are generally good quality Braille. Many Braille readers read primarily magazines because it is so difficult to get at other materials.

The National Library Service for the Blind and Physically Handicapped and the Network of Regional Libraries have not caused the problems with Braille. They have only made a contribution to them. Like others in our society, many of the libraries have accepted the prevailing attitudes toward blindness and Braille in society and reacted to them.

The beginnings of the problems pertaining to Braille go back farther than Braille itself. In fact, they stem from attitudes toward blindness with which all of us are familiar, the attitude that says any methods used by a blind person must be inferior to a method that involves the use of eyesight. We know that this attitude is false. Blind people have been victims of this kind of thinking since the beginning of recorded history. This is the greatest problem facing blind Americans today. I suppose it would be surprising if it had not had far-reaching effects on Braille, since Braille is one of the principal tools of the blind.

Reading and writing print is a system intended to be used by persons who can see the lines and loops made with ink on the page. It is a good system. Reading and writing Braille makes use of a different pathway for information to travel from a book to the brain. Reading and writing dots is a system designed for the fingertips. The fact that fewer people use Braille does not necessarily make it inferior to or slower than print. Anymore than the fact that fewer people speak Greek than Chinese could be taken to indicate that Greek is a less good language than Chinese. In fact, Braille users who have had the opportunity to become good readers and writers read rapidly and well and write rapidly and well with the Braille writer and the slate and stylus.

There are reasons why many blind individuals do not read and write Braille well, just as there are reasons why many sighted people do not read and write print well. Some of the reasons are the same. But attitudes toward Braille reduce drastically the number of students who really have the opportunity to learn it well and there are very few teachers indeed who believe Braille to be the excellent means of reading and writing by touch that it is.

Back in the 1930's and 1940's blind children largely attended schools for the blind and learned to read Braille and write with a slate and stylus. By the time I started to school in 1950, things were beginning to change.

1. Somebody came up with the idea of large print (sight saving). Blind children who could not read small print but had some limited sight were taught to read large print. This was considered (although nobody said it quite this way) more respectable than Braille. It meant that these children would not be able to read much besides textbooks, since textbooks were about all that was produced in large print. After graduating from high school, some of these "sight savers" would be unable to read anything.

2. Recorded materials were becoming more and more available. Never mind that you couldn't learn to spell from a tape, you couldn't read charts from a tape, that math could be taught best in Braille or in print. More and more children found themselves

in situations that required them to rely on recorded materials for textbooks and everything else. Children who could read large print might rely on tape recordings, but not Braille. They didn't know Braille. Some children had to rely on recorded materials primarily throughout school.

My purpose here is not to underrate records and tapes. I fully appreciate their value in increasing the amount of material available to the average blind person, but they should be a supplement to Braille. Blind children should never be forced to rely primarily on recorded material from the beginning to the end of their education.

3. By the time I started to school, first and second graders were no longer able (according to the teachers) to learn to write using a slate and stylus. Braille writers were beginning to be more widely available. Since it was quicker to teach a child to write Braille with a Braille writer this became the practice. The more Braille writers available, the longer a school could wait to start teaching students to write with a slate and stylus.

I have often wondered if it wouldn't be quicker to teach sighted children to type than to write print and cursive. I suspect it would be. But for some reason, nobody ever tried teaching typing in first grade, leaving print and cursive for some other time. Could it be that blind children are also still able to learn to write with the slate and stylus in first grade? Or could it be that blind children could begin to handle a slate and stylus as pre-schoolers, just as sighted children begin to handle pencils long before they start to school?

I am told that first graders cannot learn to use the slate and stylus because it is so confusing to write the letters backwards. Most of the slate writers I know never knew they wrote letters backwards on the slate unless someone told them so. After all, you read letters, words, lines and sentences from the beginning to the end, just as we write them from the beginning to the end on the slate, and on the Braille writer, in cursive and on the typewriter.

For my part, I grew impatient and did not wish to wait until third grade to learn to write with a slate and stylus. That would have meant that I would not have been able to write Braille at home, since I had no Braille writer. Therefore, I "borrowed" an older child's slate and stylus and taught myself to use it. It seemed very reasonable to start at the right-hand end of the slate and write in progression from the beginning to the end of the line. An [a] and an [l] are on the first side of the cell, whether reading or writing. An [o] and an [h] have a middle dot on the second side of the cell to distinguish them from a [k] and a [b].

Very few children now have the opportunity to develop good writing skills on the slate and stylus. It's not that they couldn't or wouldn't. Braille teachers do not seem to consider the slate and stylus important and appropriate for daily use as a writing tool. In some ways, this is hard to explain. However, I think the explanation has to do with teacher training and attitudes toward Braille.

4. Teachers' attitudes toward Braille make it difficult for children to receive a good foundation in Braille reading and writing. I recently talked with a teacher of blind students who had a master's degree in education of blind children from the University of Northern Colorado in Greeley. He told me that he had learned in college that one of the reasons for teaching children with partial vision to read large print is because, no matter how difficult it is for a child to read large print, that child is likely to read print better than Braille. His belief was that the average Braille reading

speed was 50-70 words per minute. I asked him if he thought this included the reading speeds of people who learned Braille, but had never used it much. He thought that was possible. When I introduced him to several individuals who could read more rapidly than they could talk, he wondered how it was possible that he could have such a low opinion of Braille. I was glad he wondered. I suggested that it would have been beneficial to him, his fellow students in college, and the children he was teaching if some effort had been made to give him accurate information about Braille. He agreed enthusiastically. I have talked with other teachers of children and adults who had similar misinformation about Braille reading and writing.

One resource teacher—who received a degree from a different university—called me and said, "A fifth grade student of mine does not like to work with the slate and stylus. I think this child should learn this skill. I understand that it takes work. What should I tell him to do?" The teacher also told me that she did not feel she wrote well with the slate and stylus. She was trying to teach a skill she did not possess. I suggested she introduce the child to a blind adult in the community who could use the slate and stylus well. This made a marked difference in the child's interest in the slate and stylus. I also suggested to the teacher that a child who found math difficult would be encouraged to do more math, instead of less, in order to improve his or her skill in mathematics.

Often newly blinded adults are encouraged to believe that they cannot ever hope to learn Braille well enough to use it a great deal and well. These newly blinded individuals quite reasonably assume their teachers and counselors know what they're talking about. In this case, many clients are misled. Fortunately, the truth is that most newly-blinded adults could learn to read and write Braille well.

When I taught newly-blinded adults to read Braille, I told them, "It is not convenient to have to learn a new way of reading and writing as an adult, but it can be done. If you are motivated to spend the time it takes to build a new skill, you can hope to read Braille at two hundred words a minute or more. Furthermore, if you make yourself do it, you can take notes with the slate and stylus in college or on the job as rapidly as anyone can take notes in print." And, quite a few students did just that.

5. Not only are attitudes among Braille teachers who teach children and adults often harmful to the skill they are teaching, but many blind individuals never have an opportunity to learn Braille at all. Some of the reasons for this have been mentioned above (large print, tape recordings, attitudes). Of course, mainstreaming has also had an effect, but mainstreaming need not prevent children from learning Braille.

Adults receive even less encouragement and fewer opportunities to learn Braille than children. A newly-blinded adult, with rare exceptions, will need to teach Braille to himself or herself. This requires high motivation at a time when a person is generally frustrated and confused about blindness. Of course, it is possible to function without Braille. But reading and writing for oneself is a skill which most people want. They also want to be encouraged, not discouraged, to seek this skill and to believe in its value.

6. A few people—largely Nonbraille users—tell us that Braille is very difficult to learn because of the contractions. There is nothing sacred about the Braille code. If changes are needed, let them be made. However, let's not insult today's children and newly-blinded adults by assuming they

can't learn the system. Braille is no more difficult to learn than dozens of other skills. Furthermore, it is no more difficult to learn than it was 20 or 40 years ago.

If certain rules ought to be changed in order to cheapen or speed up production of Braille using today's technology, by all means, let it be considered. Let us do it carefully, taking into consideration input from producers of Braille and consumers who read and write Braille. Let us draw upon the knowledge of those who understand technology. Since Braille is currently effective for those who use it, let us seek to make as few changes as possible. In other words, if certain minor changes in the Braille system would make it possible to have more Braille available, to reduce the costs of producing Braille, and/or to shorten the time it takes to make Braille materials available to readers, then Braille readers will stand together and help to do it. Since the Braille system is currently a good one, let us make changes only after careful consideration and for good reasons.

Our attitudes toward the things we do and do not do well, to a very large degree, cause us to succeed or to fail. This is not a complicated or advanced bit of psychology. It is recognized by almost everyone. Although many teachers and students of Braille do not think in these terms, they consider Braille less respectable and less efficient than print. As far as I am concerned, the shortcomings of Braille are: 1. There isn't enough material available; 2. Hundreds of teachers sell Braille short to their students. These are serious shortcomings. The solutions lie in better teaching methods, together with more production and better circulation of Braille materials.

The April, 1979 Braille Research Newsletter published by the Warwick (England) Research Unit for the Blind and the American Foundation for the Blind was entirely devoted to a discussion of Braille and its problems, "The Future of Braille" by Leslie L. Clark. Mr. Clark lists a series of studies that should be undertaken to determine the best paths to follow to maintain and expand the use of Braille in the future. He makes the error which is now so common among agencies which purport to serve the blind. He proposes to survey everybody except organizations of consumers.

It is well known to *Monitor* readers that, if asked to do so, the National Federation of the Blind could and would be glad to designate someone with vast experience in Braille to work with others on Braille, as on other matters pertaining to blindness. It would, of course, be necessary that all parties come to any such project in good faith. Such a person would have input from 50,000 or more blind individuals from all over the country. There are those among us—and we know who they are—who have a kind of experience with Braille that can be acquired in no other way than by long and active participation in the National Federation of the Blind.

I do not mean to suggest that a lot of surveys are necessary. We need to evaluate new methods of producing Braille, and the Federation is actively participating in this. However, the effectiveness of Braille reading and writing, methods for teaching children and adults, methods for training teachers of Braille and methods for circulating Braille books do not need to be surveyed. There is plenty of experience and knowledge in these areas available in the National Federation of the Blind. If anyone would like to make use of it—and we wish they would—let them come and look for it.

Braille continues to be the excellent means of reading and writing by touch it has been for the last century and a half.

Neither tape recorders nor computers can replace Braille nor decrease the need for it. They may change the uses and production of Braille somewhat, just as recorded materials and computers have affected the methods of handling print. The need for Braille is great. The problems are well-known. The challenge for us is to stand together and speak out. When we (the tens of thousands of blind Americans who comprise the National Federation of the Blind) speak together through the pages of the *Monitor,* we will be heard. This is what Federationism and the Federation is all about. It is why we have organized and why we have made such progress.

THE BRAILLE MONITOR
1800 JOHNSON STREET
BALTIMORE, MARYLAND 21230

ADDRESS CORRECTION REQUESTED